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# **Takeovers under Asymmetric Information: Block Trades and Tender Offers in Equilibrium**

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# Takeovers under Asymmetric Information: Block Trades and Tender Offers in Equilibrium

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## Abstract

I study transfers of control in a firm having atomistic shareholders and one dominant minority blockholder (incumbent). A potential acquirer can try to negotiate a block trade with the incumbent. If the negotiations are successful, the control changes hands via a block trade. If the negotiations fail, the acquirer can launch a public tender offer. According to empirical evidence, companies with minority blockholders are widespread, and both types of transactions occur in such companies. However, the existing models that allow for acquiring control through a block trade never obtain tender offers in equilibrium. In my model, asymmetry of information about the acquirer's ability to generate value leads to the negotiations failure and, hence, results in a tender offer for a range of parameters. In such an equilibrium, high ability acquirers take over the firm by means of a tender offer, intermediate types negotiate a block trade, and low types do not attempt any transaction. This result provides an immediate explanation for higher target announcement returns in tender offers as compared to block trades. The model also explains why takeover premiums and targets' stock price reaction to tender offers may be higher in countries with stronger shareholder protection and predicts that better shareholder protection should result in a higher announcements returns for targets in block trade transactions as well. Finally, the paper obtains that transfers of corporate control in firms with a dominant minority blockholder are more efficient when shareholder protection is better and provides an argument against the mandatory bid rule in strong legal regimes.

JEL classification: D82, G34

Keywords: takeovers, block trades, tender offers, shareholder protection, mandatory bid rule

## 1 Introduction

While the literature on transfers of corporate control is huge, insufficient attention has been devoted to the issue of the choice of the control transfer mode. This paper considers a firm with a dominant minority shareholder (incumbent blockholder, incumbent) and otherwise dispersed shareholders and examines the choice of an acquirer (raider) between taking the firm over by means of a public tender offer and negotiating a block trade with the incumbent blockholder.

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Firms with large non-controlling (i.e., having less than 50% of the votes) shareholders are widespread. In Faccio and Lang (2002) sample of 5,232 European companies, about 92% of firms had a shareholder with at least 5% of the voting rights, and the median largest block was 30% in terms of votes. In Claessens, Djankov, and Lang (2000) sample of 2,980 East Asian companies, about 88% of firms had a shareholder with greater than 5% voting rights, and the median largest block among such companies had about 20%. In Holderness (2009) sample of 375 listed U.S. firms, 96% of the companies had a shareholder holding more than 5% of the votes, and the median size of the largest shareholder among such companies was 17%.

It is well known by now that large minority block trades are corporate control transactions: block purchasers pay substantial “control premiums” (Dyck and Zingales, 2004) and frequently initiate changes in the management and board of directors compositions (Barclay and Holderness, 1991). While a block trade is sometimes the ultimate control transaction in a firm with a large minority blockholder, public tender offers occur in such firms as well. In Barclay and Holderness (1991) sample of 106 negotiated block trades in the U.S., in 65 cases firms were not acquired for at least a year after the block trade, while in 41 cases a block trade was followed by an acquisition of the remaining shares. In this latter subsample, tender offers to other shareholders were made simultaneously with block trades in 14 cases. Holmén and Nivorozhkin (2012), studying a sample of 195 Swedish non-financial companies find that both block trades (62 deals) and non-partial tender-offers (28 deals) occur in companies with large blockholders.

While a target’s characteristics may also affect the choice of the control transfer mode, I argue in this paper that the acquirer’s ability to generate value (or, at least, her perception about her ability) may explain when a block trade or a tender offer occurs. The paper has several contributions. First, it rationalizes the coexistence of tender offers and block trades in equilibrium in firms with a dominant minority blockholder. In particular, I argue that such coexistence cannot be explained in a model with symmetric information, essentially because the acquirer and the incumbent collectively would always prefer to exclude other shareholders from the deal. Zingales (1995) and Burkart et al (2000) allow for the choice between a block trade and a tender offer<sup>1</sup>, but in equilibrium the acquirer and the incumbent always trade the block. In both these papers information is symmetric. In my model, asymmetry of information about the acquirer’s ability introduces imperfections into the bargaining between the acquirer and the incumbent, which may result in an acquisition via a tender offer in equilibrium.

Second, the paper explains why the target’s stock price reaction to tender offers is generally higher than that to block trade announcements, as one can conclude from the empirical literature.

Third, the model predicts that takeover premiums and announcement stock returns of targets in both tender offers and block trades should be higher in countries with stronger shareholder protection, which is consistent with Rossi and Volpin (2004).

Finally, the paper obtains that transfers of corporate control are more efficient when shareholder protection is better and argues that the mandatory bid rule is beneficial for efficiency in weak legal regimes, but can be harmful when shareholder protection is strong.

Before providing intuition for the results of the paper, it is worthwhile elaborating on the ar-

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<sup>1</sup>Most papers, following Grossman and Hart (1980) and Shleifer and Vishny (1986), consider tender offers as the only mean of a takeover. In contrast, in Bebchuk (1994), block trades is the only feasible mode of control transfer.

gument why symmetric information models fail to generate tender offers in firms with dispersed shareholders and a dominant minority blockholder in equilibrium. The total value generated by the party in control consists of security benefits (profits, dividends) accruing to all shareholders and private benefits accruing to the controlling party only. Assume that, for a given controlling party, both security and private benefits the party generates are fixed, do not depend on the party's equity stake, and are common knowledge. In a tender offer, due to the classical free-rider problem (Grossman and Hart, 1980), dispersed shareholders do not agree to sell to the acquirer at a price below the security benefits the acquirer would generate. In addition, it is natural and common in the literature to rule out "panic equilibria", in which dispersed shareholders sell to a raider at a price below the security benefits generated by the incumbent.<sup>2</sup>

Thus, in a successful tender offer, the dispersed shareholders obtain at least the security benefits generated by the raider and even more when the incumbent-generated security benefits exceed those created by the raider. In contrast, if a block trade occurs, the dispersed shareholders always obtain just the security benefits generated by the raider. Hence, the small shareholders weakly gain from a tender offer as compared to a block trade. Given that both types of transactions create the same aggregate welfare (since we assumed that the private and security benefits generated by the raider do not depend on her stake), this implies that the incumbent and the acquirer weakly lose from a tender offer relative to a block trade. If one adds a cost of administering a tender offer (in reality such costs can be rather significant) the preference for a block trade becomes strict. Allowing the incumbent to counterbid makes a tender offer game even less attractive for the incumbent-raider coalition, as it can only raise the equilibrium bid.

A symmetric information model with endogenous private and security benefits a la Burkart et al (2000) would also result in a block trade in equilibrium. In Burkart et al (2000), the controlling party optimally chooses to generate more security benefits and extract less private benefits when his or her share is higher. A tender offer contest in their model is won by the raider and leads to an increase in the controlling party's share, which implies more security benefits and less private benefits. However, due to the free-riding behavior of dispersed shareholders, the whole increase in security benefits accrues to the latter. As a result, due to lower private benefits in the case of a tender offer, the acquirer and the incumbent collectively strictly prefer to trade the block.

In this paper, the acquirer's ability to generate value is her private information. Crucially, I assume that this information is "soft". The information asymmetry leads to a negotiations failure in equilibrium. Similarly to Zingales (1995), I assume that the acquirer and the incumbent first try to negotiate a block trade, and if the negotiations fail, the acquirer can launch a tender offer to all shareholders.<sup>3</sup> It is also assumed that the bargaining is structured in such a way that the raider makes a take-it-or-leave-it offer to the incumbent.<sup>4</sup>

Because they generate greater security benefits, higher types of raiders have a greater relative

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<sup>2</sup>This is justified either on the grounds of Pareto-dominance (from the shareholders' perspective, the 'trust equilibrium', i.e., when nobody tenders, Pareto-dominates the 'panic equilibrium') or by arbitrage considerations (a friendly arbitrageur, who would leave control to the incumbent, could overbid the acquirer by small amount and make a profit).

<sup>3</sup>For simplicity I do not allow the incumbent to counterbid. Allowing for a counter offer do not change the qualitative results of the model, as I show in Section 6.

<sup>4</sup>This is not crucial either.

benefit (lower relative loss) from acquiring 100% of the shares as opposed to buying just the incumbent's stake, for given tender offer and block trade prices. As a result, the following equilibrium structure emerges: the best acquirers launch a tender offer, intermediate quality acquirers do a block trade, and worst acquirers do not acquire control at all.

The fundamental reason why high types fail to negotiate a block trade is the fact that the incumbent's outside option (disagreement payoff) is private information of the raider. For given beliefs of the dispersed shareholders, if the incumbent rejects the raider's offer, low enough types of rejected raiders prefer to abstain from a tender offer, while high enough types prefer to bid. The equilibrium tender offer bid is lower than the equilibrium block price (per unit share). The latter, in turn, is lower than the incumbent's valuation of his block (per unit share). Thus, the incumbent agrees to accept the price below his valuation of the block, because he risks to obtain even less in a tender offer, if he refuses. High enough types of raiders (those who are ready to acquire the firm in a tender offer) are unhappy with the terms of the block trade. They know that they can make the incumbent worse off by launching a tender offer, and they would like to communicate this information to him in order to bring down the block price, but are unable to credibly do it, because the type is "soft" information. As a result, when the raider's type is sufficiently high, she essentially decides not to bargain with the incumbent and launches a tender offer.

The immediate implication of the described equilibrium structure is that the stock price reaction to tender offers is higher than to block trades announcements. The result is simply due to the fact that it is higher quality types that acquire the company through a tender offer. This finding is consistent with the empirical evidence. For example, Barclay and Holderness (1991) report a substantial difference in cumulative abnormal returns between control transactions that eventually involved a tender offer and those in which a block trade was the ultimate control transaction. Similarly, Holmén and Nivorozhkin (2012) report a large difference between announcement returns in non-partial tender offers and block trades. In both papers, acquisition of 100% of shares is associated with higher abnormal returns.

Other empirical studies do not make a direct comparison of block trades and tender offers. However, examining the papers on block trades and on tender offers separately, we can make a rough indirect comparison. Martynova and Renneboog (2008) provide a convenient summary on the targets' stock returns around tender offer announcements found in numerous empirical studies. At the same time, Barclay and Holderness (1991), Kang and Kim (2008), Allen and Phillips (2000), Albuquerque and Schroth (2008) provide evidence on the target stock price reaction to block trades. The numbers, provided by Martynova and Renneboog are almost always higher than those found in the block trades studies.

The model also obtains that takeover premiums and the targets' stock price reaction to both tender offers and block trades are *higher* in countries with better shareholder protection. This happens because, for a given ownership structure, strengthening shareholder protection reduces private benefits, thereby making takeovers profitable only for acquirers of sufficiently high quality. Notice, that in my model both the acquirer and the target are from the same legal environment. Hence, my results about the effects of shareholder protection are confined to domestic deals, and an empirical study that could properly test these results should control for that. Rossi and Volpin (2004) do obtain a higher takeover premiums for targets from countries with better shareholder protection, and the effect of the difference between the acquirer and

target countries' shareholder protection turned out to be statistically insignificant. Bris and Cabolis (2008) do not find any statistically significant effect of the target country's shareholder protection, but their empirical specifications do not allow to look at domestic deals separately from cross-border deals.<sup>5</sup> Cross-country research on wealth effects of block trades is much scarcer. Liao (2010) finds no statistically significant effect of shareholder protection on stock price reaction to block trades, but, again, the study does not look at domestic deals separately.<sup>6</sup>

An important result of my paper is greater efficiency of takeovers in countries with stronger shareholder protection. As Burkart et al (2012) argue, "existing theory offers little guidance as to why the takeover outcome might be more efficient in countries with stronger legal investor protection."<sup>7</sup> In my model, better legal protection impedes inefficient takeovers, but does not prevent efficient transfers of control. Stronger legal protection reduces the raider's gain from a takeover through a reduction in private benefits. Since the raider's payoff is strictly increasing in her type, lower types are first to withdraw from the takeover market when shareholder protection strengthens. However, without the possibility of block trades a too strong legal protection would also fend away some raiders who are more efficient than the incumbent.<sup>8</sup> In my model, block trades "save" efficiency. In the absence of the mandatory bid rule the acquirer can always purchase only the incumbent's block. This always brings her a positive payoff whenever she values the block more than the incumbent, which is equivalent to the acquirer being more efficient than the incumbent in my setup. Thus, an important caveat is that the efficiency implications of shareholder protection in my model are confined to firms with a large non-controlling shareholder.

Burkart et al (2012) also obtain a positive effect of legal investor protection on the efficiency of takeovers. However, in their model the rationale for that is totally different. Stronger investor protection increases the pledgeable income of the bidder, thereby reducing the role of internal funds in financing a takeover. As a result, as investor protection improves, bidder's efficiency as opposed to availability of internal funds becomes more important in determining the winner in a takeover contest.

Many countries' legislation contains some version of a mandatory bid rule (MBR), according to which an acquirer of a stake above certain threshold (usually 30% or one third of the votes) must publicly offer an 'equitable price' for the remaining shares.<sup>9</sup> Yet, there are still countries that have not introduced such a rule (U.S. is among such countries). MBR implies, in particular, that if acquisition of the incumbent block triggers a mandatory bid, the raider has to offer dispersed shareholders at least the price she paid for shares in the block trade. To the extent that blocks of the size below the threshold carry sufficient private benefits of control, my model

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<sup>5</sup>Instead, their study focuses on the effects of the difference in shareholder protection between the acquirer's and target's countries. There is also a study by Goergen and Renneboog (2004) who obtain that UK targets experience significantly greater returns than targets from Continental Europe.

<sup>6</sup>There are several studies devoted to a specific country, rather than doing cross-country comparisons. The average stock price reaction to block trades documented for Germany (Franks and Mayer, 2001), France (Banejee et al.,1998) and Poland (Trojanowski, 2008) is lower than that found in the U.S. studies (Barclay and Holderness, 1991; Kang and Kim, 2008; Allen and Phillips, 2000).

<sup>7</sup>Burkart et al (2012), p.2.

<sup>8</sup>This effect is due to the information asymmetry about the security benefits the acquirer generates. As At, Burkart, and Lee (2011) show, with such information asymmetry, takeover activity completely collapses when the acquirer is unable to extract private benefits.

<sup>9</sup>'Equitable price' is usually defined as the maximum price that the offeror paid for the same securities over a prespecified period (usually several months) prior to the mandatory bid.

is not (qualitatively) affected by the presence/absence of MBR, at least for those firms in which the incumbent's stake is smaller than or not much above the threshold.<sup>10</sup> As can be inferred from the data on median largest block sizes mentioned in second paragraph of the Introduction, such situations are frequent.

On the other hand, if acquiring control from the incumbent triggers a mandatory bid, my model provides an argument against MBR in strong legal regimes. As in many other papers that examine the effect of the MBR (e.g., Bebchuk, 1994; Burkart, Gromb, and Panunzi, 2000; Berglöf and Burkart, 2003), my paper finds that, whereas the MBR prevents some inefficient takeovers from happening, it may also impede efficient takeovers. However, in contrast to the earlier literature, I derive an explicit relationship between the quality of shareholder protection and the desirability of MBR. I show that under strong legal protection of shareholders, the negative effect of the MBR prevails. The reason is that in strong legal regimes inefficient takeovers are unlikely even without MBR, and, hence, the negative aspect of the rule (nonoccurrence of efficient takeovers) prevails.

My work is related to the literature on signaling in tender offers. In traditional tender offer models, signaling is generally impossible. By a traditional model I mean a setup, in which a tender offer is the only means of acquiring control, the bidder's strategy consists of only choosing the bid price and, possibly, the restriction on the percentage of shares she offers to buy, target shareholders are atomistic and accept the bid with certainty when indifferent. Burkart and Lee (2010) show that in such type of models, full revelation of the bidder's type never occurs in equilibrium. Shleifer and Vishny (1986) show that if one applies the equilibrium refinement based on the Grossman and Perry (1986) notion of credible beliefs, the only equilibrium that remains is a pooling equilibrium. Separation (perhaps, partial) of types becomes possible once one introduces additional features into a basic setup. For example, Hirshleifer and Titman (1990) show that signaling with a bid price is possible when dispersed shareholders can randomize between tendering and not tendering when they are indifferent. Chowdhry and Jegadeesh (1994) demonstrate that signaling is possible through toehold formation. Burkart and Lee (2010) present several other setups in which signaling is possible. They show that if the raider has a positive bargaining power vis-a-vis dispersed shareholders, full revelation of the bidder's type is possible. They also show that a fully revealing equilibrium can emerge if the bidder can commit to relinquish any fraction of her private benefits.<sup>11</sup> In our model, the feature that leads to a (partial) separation of types is the presence of a large minority blockholder and the possibility to acquire control through purchasing his share.

The paper proceeds as follows. Section 2 presents the model. In sections 3 and 4 I solve the model under the assumptions of symmetric and asymmetric information respectively. Section 5 considers implications of the model for announcement stock price reactions, efficiency of takeovers, and the effects of the mandatory bid rule. Section 6 discusses two extensions of the model. Section 7 concludes.

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<sup>10</sup>In the latter case, instead of buying the whole incumbent's stake, the acquirer could buy a share just slightly below the threshold. If the remaining share of the incumbent is significantly smaller than the one he has sold, the acquirer will become a single controlling party.

<sup>11</sup>Examples of relinquishing private benefits include reducing dilution of target shareholders, choosing a lower level of debt finance in a takeover, sharing exclusionary synergy gains from the merger with the bidder's assets, acquiring a lower toehold, and choosing a higher likelihood of bid failure through offering a lower bid.

## 2 The model

There is a firm run by a manager (incumbent), who is also the largest shareholder of the firm. His share is  $\alpha$ , while the rest of equity is dispersed. The firm has a one-share-one-vote structure. The incumbent is in control over the firm and generates value  $X_I$ . Out of this value, he can divert up to fraction  $\varphi \in (0, 1)$  to derive private benefits at no cost. So, if the incumbent diverts  $\psi \leq \varphi$  private benefits are  $\psi X_I$ , while the rest is security benefits available to all shareholders,  $(1 - \psi)X_I$ .<sup>12</sup>

Parameter  $\varphi$  reflects the strength of legal shareholder protection in the country. Thus, I am following Burkart, Panunzi, and Shleifer (2003) and At, Burkart, and Lee (2011) in modeling shareholder protection.

I assume that  $\alpha < 1/2$ , which implies that someone else could potentially gather a controlling stake bypassing the incumbent. There is a potential acquirer (raider) who can generate value  $X$  if in control. Similarly to the incumbent, she splits  $X$  into private benefits  $\psi X$  and security benefits  $(1 - \psi)X$ . While  $X$  is known to the raider, both the incumbent and the dispersed shareholders only know that  $X$  is distributed uniformly on  $[0, \bar{X}]$ . The crucial assumption is that  $X$  is “soft” information. The distribution of  $X$  is common knowledge.

**Assumption 1.**  $X_I = \bar{X}/2$ .

This assumption is made to simplify the analysis and does not qualitatively affect the results of the model. It simply says that the incumbent is neither worse nor better than the average acquirer, thereby introducing certain symmetry between the incumbent and a potential raider. This is going to rule out situations in which the expected  $X$  of an acquirer who launches a tender offer is lower than  $X_I$ . This will imply that the equilibrium tender offer bid will be equal to the expected security benefits of an acquirer who makes a tender offer.

There is no discounting in the model; all participants are risk-neutral. The sequence of the events is as follows.

$t = 1$ . The raider makes a take-it-or-leave-it offer to the incumbent for the entire incumbent’s share.<sup>13</sup> She suggests price  $p$  per unit share. The price offered is known only to the acquirer and the incumbent. If the offer is accepted, the block trade occurs, the acquirer becomes the new controlling party, and the game proceeds to  $t = 3$ .<sup>14</sup> If the offer is rejected, the game proceeds to  $t = 2$ .<sup>15</sup>

$t = 2$ . Following a rejection of the block trade offer, the raider can make a public tender offer to all shareholders at price  $b$ . I assume that a tender offer must be unconditional and unrestricted. If a tender offer is made, each shareholder, including the incumbent blockholder,

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<sup>12</sup>Thus, for given  $\psi$  (and we will see that the party in control always chooses  $\psi = \varphi$ ), there is a perfect positive correlation between security benefits and private benefits of the party in control. In Section 6 we discuss a model in which private benefits are deterministic and the same regardless of who is in control, and the information asymmetry is only about the security benefits the raider is able to generate. This modification does not change the qualitative results of the model. In contrast, a negative correlation between private benefits and security benefits may kill tender offers in equilibrium, if private benefits are too responsive to security benefits (see Section 6).

<sup>13</sup>For simplicity, I do not allow partial sales of the block, see a brief discussion at the end of the section.

<sup>14</sup>Thus, we assume that either the country does not have a mandatory bid rule, or that the incumbent block’s size is below the threshold that triggers a mandatory bid. The effects of the mandatory bid rule are discussed in Section 6.

<sup>15</sup>I could provide the acquirer with the option to make a tender offer straight away, without prior negotiations. Such a setup would lead to observationally equivalent equilibria.



decides non-cooperatively whether to tender his shares or not. Following Grossman and Hart (1980) and much of the subsequent literature, I assume that each atomistic shareholder treats his own decision as having no effect on the outcome of the tender offer (i.e., considers himself pivotal with probability zero). Furthermore, I assume that the incumbent blockholder cannot counterbid (e.g., because he has no resources). If, as a result of the tender offer, the acquirer ends up with obtaining either at least 50% of the shares or the entire incumbent's share, she gains permanent control over the company.<sup>16</sup> Otherwise, the incumbent keeps control. If the acquirer decides not to make a tender offer, the incumbent keeps control.

$t = 3$ . The party in control generates security benefits  $(1 - \psi)Y$  and private benefits  $\psi Y$ , where  $Y$  is either  $\bar{X}/2$  or  $X$  depending on who is in control.

I would like to emphasize that the assumption of no countering by the incumbent is not crucial and is made for simplicity. In Section 6 I discuss an extension with a counter-bid by the incumbent and argue that the qualitative results remain intact. To put it briefly, the possibility of countering does not eliminate the fundamental reason why the bargaining between the raider and the incumbent may fail: the fact that the incumbent's outside option in bargaining (disagreement payoff) is the raider's private knowledge, because only the raider knows whether she is going to abstain or launch a tender offer following the incumbent's refusal.

**Assumption 2.** Faced with a tender offer, dispersed shareholders do not play weakly dominated strategies.

This assumption rules out situations when the raider offers the price equal to the post-takeover security benefits she would generate and greater than the security benefits created by the incumbent, but an atomistic shareholder does not tender his share. In such a situation, if the shareholder expects the takeover to succeed with certainty, he is indifferent between tendering and not. However, 'not tendering' is weakly dominated: if holders of more than 50% of the shares do not tender, the shareholder is worse off refusing to tender.

**Assumption 3.** When the incumbent is indifferent between selling and not selling, he prefers to sell his share.

This assumption is made for simplicity and refers to the incumbent's decision both at  $t = 1$  and  $t = 2$ .

Assumptions 2 and 3 together with the control transfer rule in a tender offer (50% or the entire incumbent's share) and the assumptions that the raider's private offer can only be for the whole incumbent's stake and the public bid must be unrestricted will essentially imply that only two successful outcomes of the control transfer are possible: either the raider purchases the entire incumbent's block in a negotiated deal, or she buys 100% of the company. While it might seem that I am imposing too rigid assumptions on the available strategies, they are arguably not crucial for the qualitative results of the model. What is really needed for my results is that a

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<sup>16</sup>This assumption is made for simplicity. An alternative assumption would be that the party with the larger amount of shares becomes controlling, as in Burkart, Gromb, and Panunzi (2000). Such an assumption would complicate the analysis, because then the blockholder would sometimes have an incentive to sell slightly more than a half of his block to the raider in order to free-ride on the value improvement created by the latter. Arguably, such a modification would not change the qualitative results of the model: what is eventually needed for my results is that a tender offer results in a higher acquirer's share compared to a block trade.

successful tender offer leads to a greater ultimate acquirer's share compared with a block trade, which sounds very plausible and is supported by the real life data. Thus, neither allowing for partial block sales, nor permitting offers restricted to 50% of the shares should be crucial for the model.

For concreteness, let us assume that if the raider is indifferent between abstaining and acquiring control, she abstains.

### 3 Symmetric information benchmark

As a benchmark, let us first solve the model as if  $X$  were common knowledge. We will see that, in this case, in equilibrium, the raider never prefers a tender offer to occur and, if a tender offer involves even a very small cost, the preference for a block trade becomes strict.

Since there is no cost of private benefit extraction in the model, at  $t = 3$  the party in control always steals as much value as possible, i.e., sets  $\psi = \varphi$ , unless it has 100% of the company. In the latter case, the raider (only the raider can end up having 100% of the votes) is indifferent among all feasible values of  $\psi$ . To resolve this indeterminacy I assume that the raider sets  $\psi = \varphi$  even when she acquires the entire company.<sup>17</sup> This is actually not crucial, but simply convenient. What I really need is that the raider can acquire the whole company by bidding  $(1 - \varphi)X$  (unless  $X < \bar{X}/2$ , see below). If all shareholders except one atomistic shareholder tender their shares to the bidder, the bidder will strictly prefer to set  $\psi = \varphi$  at  $t = 3$ , and, hence, dispersed shareholders will indeed agree to tender for  $(1 - \varphi)X$ .

In order to solve the game, let us make the assumption of 'no-panic-equilibria', common in the literature. That is, let us assume that, when  $X < X_I = \bar{X}/2$ , shareholders would never tender for a price below  $(1 - \varphi)\bar{X}/2$ . In principle, all shareholders tendering for a price  $b \in ((1 - \varphi)X, (1 - \varphi)\bar{X}/2)$  is an equilibrium behavior (then, if the others tender and you do not, your payoff is  $(1 - \varphi)X < b$ , because the takeover occurs regardless of your decision). This equilibrium is sometimes called a 'panic equilibrium'. The 'no-panic-equilibria' assumption can be justified on the grounds of Pareto-dominance (from the shareholders' perspective, the 'trust equilibrium', i.e., when nobody tenders, Pareto-dominates the 'panic equilibrium') or by the arbitrage argument (a friendly arbitrageur, who would leave control to the incumbent, could overbid the acquirer by  $b + \varepsilon$  and make a profit).

The raider's payoff from acquiring all shares at price  $b$  is  $(1 - \varphi)X + \varphi X - b = X - b$ , and her payoff from acquiring just the incumbent's block at price  $p$  is  $\alpha[(1 - \varphi)X - p] + \varphi X$ .

**Lemma 1** *Assume the bargaining has failed and consider the tender offer stage. Then, the equilibrium of this subgame under symmetric information is as follows:*

- *When  $X \leq (1 - \varphi)\bar{X}/2$ , the acquirer does not make a tender offer*
- *When  $X \in ((1 - \varphi)\bar{X}/2, \bar{X}/2]$ , the acquirer bids  $b = (1 - \varphi)\bar{X}/2$ , all shareholders (including the incumbent blockholder) tender their shares, the acquirer's payoff is  $X - (1 - \varphi)\bar{X}/2 > 0$*
- *When  $X \in \left(\bar{X}/2, \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha}\right]$ , the acquirer bids  $b = (1 - \varphi)X$ , all shareholders (including the incumbent blockholder) tender their shares, the acquirer's payoff is  $\varphi X$*

<sup>17</sup>The same assumption is implicitly made in At, Burkart, and Lee (2011).

- When  $X > \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha}$ , the acquirer bids  $b = (1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$ , the incumbent blockholder tenders his shares, while other shareholders do not, the acquirer's payoff is  $[\alpha(1-\varphi) + \varphi](X - \bar{X}/2)$

**Proof.** Since a small shareholder perceives himself pivotal with zero probability, then, if he expects the takeover to occur, he will not sell his share at a price below the security benefits the raider would generate (the free-rider problem due to Grossman and Hart, 1980). Moreover, due to the ‘no-panic-equilibria’ assumption, dispersed shareholders will never sell at a price lower than the security benefits they receive under the incumbent’s control. Thus, it cannot happen in equilibrium that the raider takes the firm over *and* buys the shares of the dispersed shareholders at the price below  $\max\{(1-\varphi)X, (1-\varphi)\bar{X}/2\}$ . In addition, if the incumbent is pivotal to the outcome of a tender offer, for given strategies of dispersed shareholders, he is not going to sell at a price below his valuation of his stake, i.e., below  $(1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$ .

With these arguments in mind, we can first conclude that for  $X < \bar{X}/2$  the minimum price at which the raider can acquire the company is  $(1-\varphi)\bar{X}/2$ . All shareholders tender their shares at this price (the incumbent, of course, is unhappy with the takeover, since he loses relative to the status quo, but he cannot affect the outcome). The raider’s payoff is then  $X - (1-\varphi)\bar{X}/2$ , which is negative for  $X < (1-\varphi)\bar{X}/2$  (and then the raider does not make a tender offer) and positive for  $X > (1-\varphi)\bar{X}/2$  (and then the raider acquires the company at  $(1-\varphi)\bar{X}/2$ ).

When  $X \geq \bar{X}/2$ , due to the free-rider problem, the minimum price at which the raider can attract the shares of the dispersed shareholders is  $(1-\varphi)X$ . When this value is lower than the incumbent’s valuation of his block,  $(1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$  (equivalently,  $X < \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha}$ ),  $(1-\varphi)X$  is the minimum price at which the company can be acquired. Again, all shareholders tender, and the incumbent cannot affect the outcome of the takeover. The raider obtains  $X - (1-\varphi)X = \varphi X$ .

When  $(1-\varphi)X > (1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$  (equivalently,  $X > \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha}$ ), the raider does not need to attract the dispersed shareholders’ shares. Instead she can bid just the incumbent’s valuation of his block:  $b = (1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$ . In the unique equilibrium, following this offer, the dispersed shareholders abstain, but the incumbent tenders. Indeed, given that the control is transferred, the dispersed shareholders are better off retaining their shares, as the bid is lower than the security benefits they would receive under the raider’s control. At the same time, the incumbent prefers to tender, because he is pivotal to the outcome of the takeover.<sup>18</sup> The raider’s payoff is  $\alpha[(1-\varphi)X - b] + \varphi X$ . Bidding  $(1-\varphi)X > (1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$  in order to attract the shares of dispersed shareholders is clearly suboptimal, because the raider would not make any profit from purchasing their shares at this price, while paying more for the incumbent’s block. Bidding below  $(1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$  will result in the incumbent’s refusal. Thus, whenever  $(1-\varphi)X > (1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$ ,  $b = (1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$  is optimal, and the raider’s payoff is  $[\alpha(1-\varphi) + \varphi](X - \bar{X}/2)$ . ■

The key thing to notice in Lemma 1 is that, in situations when the raider acquires the whole company, apart from obtaining the private benefit she never makes a profit on purchasing shares, and makes a loss when  $X \in ((1-\varphi)\bar{X}/2, \bar{X}/2)$ . This is because the raider has to bid at least the security benefits she would generate, and even more when she is less efficient than the incumbent, if she wants to convince the dispersed shareholders to sell.

<sup>18</sup>If he does not, he gets the same payoff, and I assumed that the incumbent tenders in the case of indifference.

For  $X \in \left[ \bar{X}/2, \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha} \right]$ , the raider simply obtains her private benefits  $\varphi X$ , and for  $X \in \left( (1-\varphi)\bar{X}/2, \bar{X}/2 \right)$ , she obtains  $X - (1-\varphi)\bar{X}/2 < \varphi X$ . This observation suggests that the raider would like to avoid acquiring 100% of the company, at least in the zone where she pays more than the security benefits she will generate. The following lemma shows that indeed, in equilibrium the raider never prefers to let the game reach the tender offer stage, and for  $X \in \left( (1-\varphi)\bar{X}/2, \bar{X}/2 \right)$  the preference for a negotiated block trade is strict.

**Lemma 2** *The equilibrium in the full game under symmetric information is as follows:*

- *When  $X \leq (1-\varphi)\bar{X}/2$ , there is no transfer of control*
- *When  $X \in \left( (1-\varphi)\bar{X}/2, \bar{X}/2 \right)$ , there is a negotiated block trade at price  $p = (1-\varphi)\bar{X}/2$ , the acquirer's payoff is  $\alpha \left[ (1-\varphi)(X - \bar{X}/2) \right] + \varphi X > X - (1-\varphi)\bar{X}/2$ .*
- *When  $X \in \left[ \bar{X}/2, \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha} \right]$ , either a block trade at price  $p = (1-\varphi)X$  or a tender offer with bid  $b = (1-\varphi)X$  occurs. In the case of a tender offer, all shareholders tender their shares. The acquirer is indifferent between the two scenarios and obtains  $\varphi X$  in either case.*
- *When  $X > \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha}$ , either a block trade at price  $p = (1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$  or a tender offer with bid  $b = (1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$  occurs. In the case of a tender offer, only the incumbent blockholder tenders his shares. The acquirer is indifferent between the two scenarios and obtains  $[\alpha(1-\varphi) + \varphi] (X - \bar{X}/2)$  in either case.*

**Proof.** When  $X \leq (1-\varphi)\bar{X}/2$ , there is no tender offer following the negotiations failure. At the same time, there are no gains from a block trade for the incumbent and the raider, because the former is more efficient. Hence, nothing happens in this case.

When  $X \in \left( (1-\varphi)\bar{X}/2, \bar{X}/2 \right)$ , the raider can take the firm over by making a tender offer at price  $b = (1-\varphi)\bar{X}/2$ . If this happens, the raider will obtain  $X - (1-\varphi)\bar{X}/2$ , as we know from Lemma 1. However, the raider overpays for the shares of dispersed shareholders:  $(1-\varphi)\bar{X}/2$  is greater than  $(1-\varphi)X$ , the security benefits she would generate. Thus, she would prefer to buy as few shares as possible at this price. Therefore, the raider proposes  $p = (1-\varphi)\bar{X}/2$  to the incumbent, and the incumbent agrees (his outside option is to obtain the same in a tender offer). Proposing less would lead to the incumbent's refusal, and proposing more is clearly suboptimal. The acquirer obtains  $\alpha \left[ (1-\varphi)(X - \bar{X}/2) \right] + \varphi X > X - (1-\varphi)\bar{X}/2$ .

When  $X \in \left[ \bar{X}/2, \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha} \right]$ , the raider neither gains nor loses on purchasing shares in a tender offer: she pays exactly the security benefits she is going to generate and receives only her private benefits  $\varphi X$ . Therefore, the raider cannot gain from a block trade. The minimum price she has to offer to the incumbent in order for the latter to agree is the same  $(1-\varphi)X$ . If she offers less, the incumbent will refuse as he understands that he will get  $(1-\varphi)X$  in a tender offer. Thus, in a block trade the raider gets  $\alpha \left[ (1-\varphi)X - (1-\varphi)X \right] + \varphi X = \varphi X$ .

When  $X > \bar{X}/2 + \frac{\varphi\bar{X}}{2(1-\varphi)\alpha}$ , if the game reaches the tender offer stage, the raider acquires control with bid of just  $(1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$ , and the only shareholder who tenders to the raider is the incumbent. The raider could obviously offer the same  $(1-\varphi)\bar{X}/2 + (\varphi/\alpha)\bar{X}/2$  at  $t = 0$ , the incumbent would agree (but would clearly reject any lower price), and the raider would obtain the same payoff as from the tender offer. ■

Notice that in the last zone, if the raider goes for a tender offer, it essentially results in a block trade anyway. This is because in this zone the incumbent is so much less efficient than the raider that it becomes cheaper for the raider to bid the incumbent’s valuation of his block than to attract the shares of dispersed shareholders. Thus, we have some sort of non-monotonicity with respect to  $X$  (ignoring the zone where control is not transferred at all): for small  $X$  a block trade occurs, for intermediate  $X$  the raider is indifferent between a block trade and a tender offer, and for high  $X$  again a block trade essentially occurs (even if as a result of a tender offer). We are not going to have this non-monotonicity in the asymmetric information model: all raiders with  $X$  above certain threshold will acquire 100% of the shares (unless the threshold completely disappears, in which case the only mode of control transfer will be block trades).

To summarize the solution under symmetric information, tender offers are weakly dominated by block trades. Dispersed shareholder are never willing to sell at a price below the security benefits the raider would generate and sometimes “demand” even a higher price (when the incumbent is more efficient than the raider). Therefore, given that the raider obtains control, she cannot make any profit from purchasing the dispersed shares and sometimes makes a loss. If we introduce a small cost of administering a tender offer (empirically such costs are pretty large, and should be larger than any administrative costs a negotiated block trade involve), tender offers will be strictly dominated by block trades, meaning that we should never observe tender offers. If we introduced a possibility of a tender offer contest between the acquirer and the incumbent, that would make the case for block trades even stronger, because the contest would only drive up the bid price (see Section 6).

I will show now that under asymmetric information about  $X$ , for a wide range of parameters, high types of acquirers will *strictly* prefer to make a tender offer in equilibrium, while intermediate types will opt for a block trade (the lowest types will abstain from any transaction). Hence, I will rationalize the simultaneous existence of both types of corporate control transactions in firms with a dominant minority blockholder.

## 4 Asymmetric information case

The analysis of the asymmetric information case has similarities to the analysis of tender offers with bidder’s private information by At, Burkart, and Lee (2011), but, in contrast to that paper, I have negotiations between the acquirer and the incumbent in the first stage of the game.

**Assumption 4.** If a block trade and a tender offer yield the same payoff to the raider, the raider prefers the block trade.

This assumption rules out equilibria with tender offers resulting in buying just the incumbent’s share. The assumption does not affect my results, but greatly simplifies the analysis under asymmetric information.

In the subsequent text, when I say that the raider “makes a tender offer” (“goes for a tender offer”, “launches a bid”, etc.) in equilibrium, I will mean that the raider first deliberately offers a very low price to the incumbent, such that the latter rejects, and then makes a tender offer.

The following three lemmas are very helpful for the subsequent analysis.

**Lemma 3** *If an acquirer with some  $\tilde{X}$  prefers a block trade at price  $p$  to doing nothing (abstaining), so do all acquirers with  $X > \tilde{X}$ .*

**Proof.** A block trade at price  $p$  is preferred to abstention whenever  $\alpha [(1 - \varphi)X - p] + \varphi X > 0$ , or  $X > \alpha p / [\alpha(1 - \varphi) + \varphi]$ . Clearly, if this inequality holds for some  $\tilde{X}$ , it also holds for all  $X > \tilde{X}$ . ■

**Lemma 4** *If an acquirer with some  $\tilde{X}$  prefers acquiring 100% of shares at price  $b$  to abstaining, so do all acquirers with  $X > \tilde{X}$ .*

**Proof.** Full acquisition at price  $b$  is preferred to abstention whenever  $X - b > 0$ , or  $X > b$ . Clearly, if this inequality holds for some  $\tilde{X}$ , it also holds for all  $X > \tilde{X}$ . ■

**Lemma 5** *If an acquirer with some  $\tilde{X}$  prefers acquiring 100% of shares at price  $b$  to a block trade at price  $p$ , so do all acquirers with  $X > \tilde{X}$ .*

**Proof.** Acquisition at price  $b$  is preferred to a block trade at price  $p$  whenever  $X - b > \alpha [(1 - \varphi)X - p] + \varphi X$ , or  $X > (b - \alpha p) / [(1 - \varphi)(1 - \alpha)]$ . Clearly, if this inequality holds for some  $\tilde{X}$ , it also holds for all  $X > \tilde{X}$ . ■

Before we proceed, let us establish that there exists no equilibrium in which some types of raiders acquire only the incumbent's stake as a result of a tender offer. This result will allow us to unambiguously identify a successful tender offer with the acquisition of 100% of the shares, and an acquisition of the incumbent's block – with a negotiated block trade.

**Lemma 6** *Given Assumption 4, there exists no equilibrium in which some types of raiders acquire only the incumbent's block in a tender offer*

**Proof.** See the Appendix. ■

Now, let us make the following important observations. If some types of acquirers do a block trade in equilibrium, they all do it at the same price. Otherwise, a type who buys the block at a price higher than another type would clearly deviate and offer the lower price. Second, the equilibrium bid must also be the same for all types who acquire the whole company for the same reason. Let us denote the equilibrium block trade price and bid (per unit share) by  $p^*$  and  $b^*$  respectively.

These observations together with Lemmas 3 to 6 imply a very simple equilibrium structure. Specifically, any equilibrium is characterized by maximum two thresholds,  $X'$  and  $X''$ , such that: types with  $X \leq X'$  do not acquire control, types with  $X \in (X', X'']$  purchase the incumbent's block in a privately negotiated deal, and types with  $X > X''$  acquire the whole company through a tender offer. Note that the existence of all three zones is not guaranteed. Depending on the parameters, there can potentially be equilibria without block trades as well as equilibria without tender offers by any type. However, the ordering of segments is unique: that is, it cannot be that a type who does a block trade has a higher  $X$  than someone who goes for a tender offer, or that an abstainer has a higher type than someone who acquires control.

It is rather obvious that an equilibrium with all types abstaining does not exist, for the acquirer with  $X = \bar{X}$  could always launch a tender offer with bid  $(1 - \varphi)\bar{X}$  and earn the profit  $\varphi\bar{X}$  (such an offer would be accepted by the dispersed shareholders regardless of their beliefs).

It is also straightforward that the zone with abstainers must exist in equilibrium. If it did not, that would mean that even the type with  $X = 0$  acquires the firm at a positive price, which would be clearly suboptimal.<sup>19</sup>

Thus, there remain three potential types of equilibria to consider:

- all types with  $X \in [0, X_{BT}]$  abstain from any transaction, and all types with  $X \in (X_{BT}, \bar{X}]$  do a block trade;
- all types with  $X \in [0, X_{TO}]$  abstain from any transaction, and all types with  $X \in (X_{TO}, \bar{X}]$  acquire the firm in a tender offer;
- all types with  $X \in [0, X']$  abstain from any transaction, all types with  $X \in (X', X'']$  do a block trade, and all types with  $X \in (X'', \bar{X}]$  acquire the firm in a tender offer.

For given values of the parameters, there is generally a continuum of equilibria due to the fact that the Perfect Bayesian Equilibrium concept does not pin down out-of-equilibrium beliefs. Common refinements, such as the Cho-Kreps intuitive criterion or D1 or D2 criteria do not help to reduce the set of equilibria. While the multiplicity of equilibria in this model is not a problem for rationalizing the existence of tender offers, it makes difficult to make predictions about stock price reactions to takeover announcements as well as derive efficiency implications of the model. In order to cope with this problem, I apply the concept of “credible beliefs” due to Grossman and Perry (1986). In the context of takeovers, this concept was used in Shleifer and Vishny (1986) and At, Burkart, and Lee (2011).<sup>20</sup>

Let us start from the last, “richest”, case.

**Lemma 7** *An equilibrium satisfying the credible beliefs criterion of Grossman and Perry (1986) with  $X' \in (0, \bar{X})$  and  $X'' \in (X', \bar{X})$ , such that all types with  $X \in [0, X']$  abstain from any transaction, all types with  $X \in (X', X'']$  do a block trade, and all types with  $X \in (X'', \bar{X}]$  acquire 100% of shares in a tender offer, exists if and only if  $\varphi \in (\alpha/(1+\alpha), 1)$ . The equilibrium of this type is unique for all  $\varphi \in (\alpha/(1+\alpha), 1)$ , and in this equilibrium*

$$X' = \frac{1-\varphi}{2(1-\alpha+\alpha\varphi)}\bar{X}, \quad X'' = \frac{1-\varphi}{1-\alpha+\alpha\varphi}\bar{X},$$

$$p^* = \frac{(1-\varphi)(\alpha+\varphi-\alpha\varphi)}{2\alpha(1-\alpha+\alpha\varphi)}\bar{X}, \quad b^* = \frac{(1-\varphi)(X''+\bar{X})}{2} = \frac{(1-\varphi)(2-\alpha-\varphi+\alpha\varphi)}{2(1-\alpha+\alpha\varphi)}\bar{X} < p^*.$$

**Proof.** See the Appendix. ■

The equilibrium is illustrated in Figure 1. In this equilibrium a raider is faced with the following trade-off: acquiring 100% of shares at a lower price,  $b^*$ , versus buying relatively few shares (stake  $\alpha$ ) at a higher price,  $p^*$ . In both cases, the raider obtains the private benefits. However, her payoff is more sensitive to her type when the takeover occurs through a tender offer as opposed to a block trade, precisely because she acquires more shares in a tender offer.

<sup>19</sup>It is rather obvious that a zero price would be rejected by the incumbent.

<sup>20</sup>In general, a perfect sequential equilibrium in the sense of Grossman and Perry (1986) is not guaranteed to exist. Fortunately, in our case, such an equilibrium exists for any values of the parameters.

Thus, higher types gain relatively more (or lose relatively less) from a tender offer compared to a block trade. As a result, the types who acquire control sort into those who do it through a block trade ( $X \in (X', X'')$ ) and those who launch a tender offer ( $X \in (X'', \bar{X}]$ ). More formally, types from  $(X'', \bar{X}]$  first offer some price below  $p^*$  to the incumbent, get rejected, and then launch a tender offer. The lowest types ( $X \in [0, X']$ ) prefer to abstain from any transaction.

Similarly to the symmetric information model, the equilibrium bid equals the expected post-takeover security benefits:  $b^* = (1 - \varphi)(X'' + \bar{X})/2$ . Notice that under asymmetric information there also exist equilibria where  $b^* > (1 - \varphi)(X'' + \bar{X})/2$ . These equilibria rely on the out-of-equilibrium belief that the security benefits generated by a raider bidding  $b < b^*$  are below  $b$ :  $E((1 - \varphi)X | b) < b$ . We follow Shleifer and Vishny (1986) and At et al (2011) in selecting the minimum bid equilibrium, which is the unique equilibrium satisfying the credible beliefs criterion of Grossman and Perry (1986). In such equilibrium  $b^* = (1 - \varphi)(X'' + \bar{X})/2$ , and any price below this value is rejected.

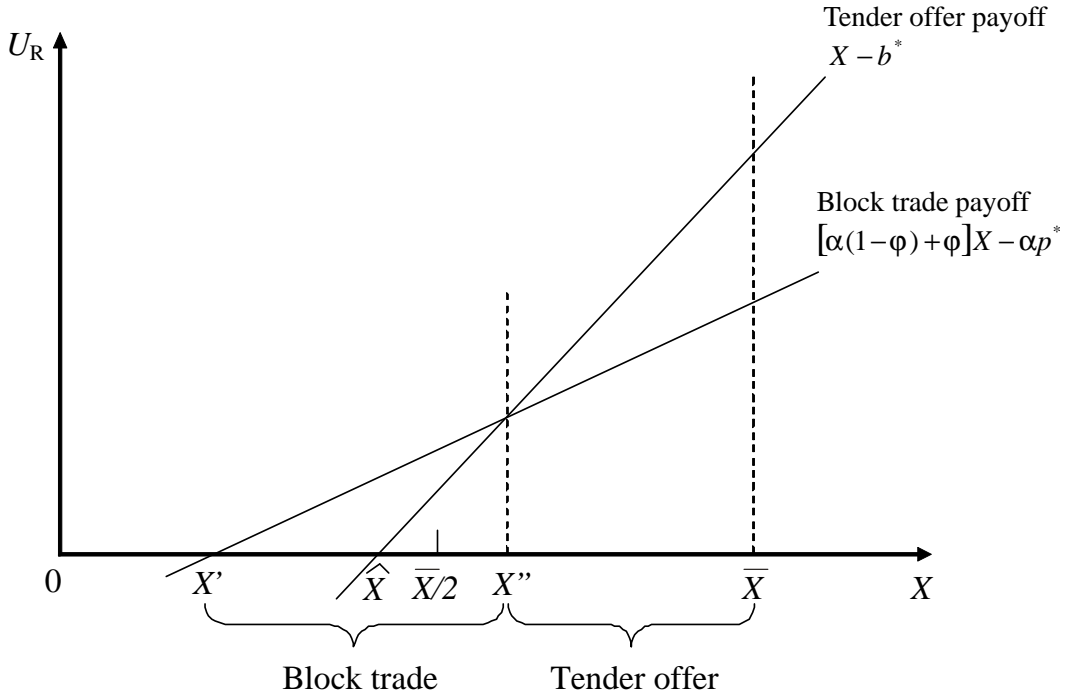


Figure 1. Equilibrium with block trades and tender offers.

The raider with  $X = \hat{X} \in (X', X'')$  (see Figure 1) is indifferent between bidding  $b^*$  and abstaining. If the incumbent rejects the equilibrium offer  $p^*$ , types  $(X', \hat{X}]$  abstain, whereas types  $(\hat{X}, X'']$  launch a bid. Since, in equilibrium, any bid below  $b^*$  is rejected, the latter types have to bid  $b^*$ . Notice that in our equilibrium  $b^* < p^* < (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . The wedge between  $p^*$  and  $b^*$  and the mere coexistence of block trades and tender offers in equilibrium is due to the asymmetry of information. As we have seen from Lemma 2, under symmetric information, a raider who is ready to launch a tender offer at price  $b$  could always bring her private offer  $p$  down to  $b$ , or, equivalently, keep the incumbent just at his disagreement payoff. Under asymmetric information, the disagreement payoff of the incumbent is private information of the raider, because only the raider knows whether she is going to abstain or launch a tender offer if rejected by the incumbent. Types who would launch a tender offer (relatively high types) would like to communicate that to the incumbent in order to convince him to sell at a lower



price. However, they cannot credibly do it, because the type is soft information. As a result, among the types who do a block trade, higher types pay “too much” for the block (they would pay less if they could credibly reveal their type to the incumbent), whereas lower types pay “too little” (they would have to pay more if the incumbent knew their type). As a result, very high types ( $X > X''$ ) are not willing to buy the block at all and prefer to acquire 100% at a lower price per share.

Notice that the incumbent agrees to sell the block at a price below his valuation of the block. This is precisely because he is not sure what is going to happen if he rejects: with a positive probability a tender offer will follow, and then he will get an even lower price. In fact, in the equilibrium of Lemma 7 the incumbent is just indifferent between accepting price  $p^*$  and rejecting it.<sup>21</sup>

Let us turn now to the second potential type of equilibrium, the one in which all types with  $X \in [0, X_{TO}]$  abstain, and all types with  $X \in (X_{TO}, \bar{X}]$  acquire the firm in a tender offer. It turns out that such an equilibrium does not exist.

**Lemma 8** *For any value of  $\varphi$ , there exists no equilibrium satisfying the credible beliefs criterion in which no type does a block trade.*

**Proof.** See the Appendix. ■

It should be noted that, if we do not impose the requirement of credible beliefs, an equilibrium without block trades actually exists for all  $\varphi > 1/3$ . However, it is supported by the non-credible (in the sense of Grossman and Perry (1986)) belief that a raider who wants to profit by deviating to a block trade is of such a low type in expectation that she will most likely abstain if the incumbent rejects (see the Appendix for details).

Finally, let us consider the first type of equilibrium, the one in which all types with  $X \in [0, X_{BT}]$  abstain from any transaction, and all types with  $X \in (X_{BT}, \bar{X}]$  do a block trade.

**Lemma 9** *An equilibrium in which all types with  $X \in [0, X_{BT}]$  abstain from any transaction, and all types with  $X \in (X_{BT}, \bar{X}]$  do a block trade exists if and only if  $\varphi \in (0, \alpha/(1+\alpha)]$ . The equilibrium of this type is unique for all  $\varphi \in (0, \alpha/(1+\alpha)]$ . In this equilibrium  $X_{BT} = \bar{X}/2$  and  $p^* = (1-\varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ , and the credible beliefs criterion is satisfied.*

**Proof.** See the Appendix. ■

Thus, in this equilibrium the acquirer pays exactly the incumbent’s valuation of his block in a block trade. Naturally, at this price the transaction occurs if and only if the acquirer is more efficient than the raider, i.e., whenever  $X > \bar{X}/2$ .

As follows from Lemmas 7 to 9, for any constellation of the parameters, there exists a unique equilibrium<sup>22</sup>, satisfying the credible beliefs criterion. With this in mind, I can now fully characterize the equilibria for all values of the parameters.

<sup>21</sup>Again, there are potentially many other equilibria, in which the incumbent strictly prefers to accept  $p^*$ . These equilibria are based on the incumbent’s out-of-equilibrium belief that any lower  $p$  is offered by “weak” enough raiders on average, so that a tender offer is unlikely following a rejection. However, such equilibria are eliminated by the application of the credible beliefs criterion.

<sup>22</sup>A unique equilibrium outcome, to be precise. There can be multiple equilibria with the same outcome but different out-of-equilibrium beliefs.

**Proposition 1** *The unique equilibrium satisfying the credible beliefs criterion is as follows:*

- For  $\varphi \in (0, \alpha/(1+\alpha)]$  all types with  $X \in [0, \bar{X}/2]$  abstain from any transaction, and all types with  $X \in (\bar{X}/2, \bar{X}]$  do a block trade at price  $p^* = (1-\varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ .
- For  $\varphi \in (\alpha/(1+\alpha), 1)$  all types with  $X \in [0, X']$  abstain from any transaction, all types with  $X \in (X', X'']$  do a block trade, and all types with  $X \in (X'', \bar{X}]$  acquire the firm in a tender offer, with

$$X' = \frac{1-\varphi}{2(1-\alpha+\alpha\varphi)}\bar{X}, \quad X'' = \frac{1-\varphi}{1-\alpha+\alpha\varphi}\bar{X},$$

$$p^* = \frac{(1-\varphi)(\alpha+\varphi-\alpha\varphi)}{2\alpha(1-\alpha+\alpha\varphi)}\bar{X}, \quad b^* = \frac{(1-\varphi)(X''+\bar{X})}{2} = \frac{(1-\varphi)(2-\alpha-\varphi+\alpha\varphi)}{2(1-\alpha+\alpha\varphi)}\bar{X} < p^*$$

- The “switch” from one type of equilibrium to the other type at  $\varphi = \alpha/(1+\alpha)$  is continuous, that is, at  $\varphi = \alpha/(1+\alpha)$   $X' = \bar{X}/2$ ,  $X'' = \bar{X}$ , and  $p^* = \frac{(1-\varphi)(\alpha+\varphi-\alpha\varphi)}{2\alpha(1-\alpha+\alpha\varphi)} = (1-\varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ .

Notice that our equilibrium exhibits continuity with respect to the parameters even at  $\varphi = \alpha/(1+\alpha)$ . Once we approach this point by decreasing  $\varphi$ , tender offers gradually disappear, and the set of types who do a block trade as well as the price of the block converge to the set of block purchasers and the block price for  $\varphi \in (0, \alpha/(1+\alpha)]$ . As  $\varphi$  decreases, set  $(X'', \bar{X}]$  shrinks, essentially because tender offers become less attractive due to a greater price the bidder has to pay in a tender offer. There are several effects simultaneously at play. Since the security benefits the bidder generates are decreasing in  $\varphi$ , lowering  $\varphi$  pushes the tender offer price up (both due to higher security benefits for given  $X$  and due to an increase in the average quality of bidders). At the same time, the incumbent’s valuation of his block,  $(1-\varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  decreases as  $\varphi$  falls, because it is more sensitive to private benefits than to security benefits. The first effect exerts an upward pressure on the block trade price (a higher bid increases the incumbent’s expected disagreement payoff), whereas the second effect exerts a downward pressure on it (a lower value of the block for the incumbent decreases his disagreement payoff). As a result the block trade price does not increase as much as the tender offer bid and even may decrease.<sup>23</sup> Therefore, the relative attractiveness of a tender offer compared to a block trade decreases, and the set of types who make a tender offer shrinks. Eventually, when  $\varphi$  becomes too small, even the highest type prefers to switch to a block trade. At  $\varphi = \alpha/(1+\alpha)$  the highest type is just indifferent between acquiring 100% of shares at  $(1-\varphi)\bar{X}$  and buying the incumbent’s stake at  $(1-\varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . In fact, the two prices are equal at this point. It is rather intuitive that a further decrease in  $\varphi$  will make the highest type strictly prefer a block trade.

The main contribution of this section is that it rationalizes the simultaneous existence of tender offers and block trades in firms with a dominant minority blockholder. When either legal shareholder protection is bad enough (high  $\varphi$ ) or the incumbent’s stake is low enough, tender offers appear in equilibrium. The model produces several interesting implications, which I am going to discuss now.

<sup>23</sup>One can show that  $p^*$  is generally non-monotonic in  $\varphi$ .

## 5 Model implications

The model yields implications for:

- the stock price reactions to the announcements of block trades and tender offers,
- the size of the takeover premium in tender offers (since all tender offers are successful, the takeover premium is equal to the stock price reaction to the tender offer),
- the efficiency of takeovers and the effects of the mandatory bid rule.

For all types of implications, I will concentrate on the effects of the quality of legal shareholder protection, that is, parameter  $\varphi$ . Before moving to the effects of shareholder protection let us formulate one result that follows immediately from the analysis.

### 5.1 Announcement stock price reaction: block trades versus tender offers

**Proposition 2** *For a given incumbent blockholder's share, the stock price reaction to a tender offer is higher than to an announcement of a block trade.*

This result follows immediately from the equilibrium structure: tender offers are simply made by better acquirers. Once a block trade is announced, the stock price becomes  $(1 - \varphi)(X' + X'')/2$ , while a tender offer raises the stock price to  $(1 - \varphi)(X'' + \bar{X})/2$ . This result explains the empirical evidence: indeed targets' stock prices react to tender offers more positively than to block trade announcements. For example, Barclay and Holderness (1991) report a substantial difference in cumulative abnormal returns around the announcement date between those deals that resulted in full acquisitions and those in which a block trade was the ultimate control transaction. Similarly, Holmén and Nivorozhkin (2012) report a large difference between announcement returns in non-partial tender offers and block trades. In both papers, acquisition of 100% of shares is associated with higher abnormal returns. Although other empirical studies do not directly compare block trades and tender offers, a rough indirect comparison<sup>24</sup> can be made by looking at these papers separately. Martynova and Renneboog (2008) provide a convenient summary on the targets' stock returns around tender offer announcements found in numerous empirical studies. At the same time, Barclay and Holderness (1991), Kang and Kim (2008), Allen and Phillips (2000), Albuquerque and Schroth (2008) provide evidence on the targets' stock price reaction to block trades. The numbers, provided by Martynova and Renneboog are almost always higher than those found in the block trades studies.

### 5.2 Efficiency of takeovers and the effects of the mandatory bid rule

From Proposition 1 it immediately follows that, for  $\varphi \in (\alpha/(1 + \alpha), 1)$ , both  $X'$  and  $X''$  increase with an improvement in shareholder protection, i.e., as  $\varphi$  falls. As  $\varphi$  reaches  $\alpha/(1 + \alpha)$  from above, a further improvement in legal protection does not change the set of types who take the company over. Hence, the following proposition is true.

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<sup>24</sup>Such comparison is very rough, of course, due to differences in samples, time periods, and windows over which returns were measured.

**Proposition 3** *For a given incumbent blockholder's share, when shareholder protection is stronger, takeovers both via block trades and via tender offers are implemented by higher quality acquirers. When shareholder protection is not strong enough (i.e.,  $\varphi > \alpha/(1 + \alpha)$ ), all efficient takeovers occur, but some inefficient takeovers occur as well. When shareholder protection becomes sufficiently strong, (i.e.,  $\varphi \in (0, \alpha/(1 + \alpha)]$ ), the first-best (i.e., a transfer of control occurring if and only if  $X \geq \bar{X}/2$ ) is achieved. Overall, shareholder protection increases (weakly) the efficiency of takeovers of targets with a dominant minority shareholder.*

Since, with an increase in shareholder protection, private benefits diminish relative to security benefits, only good enough acquirers find it profitable to make a takeover when the law protects small shareholders well. Thus, as legal protection improves, the average quality of raiders that actually acquire control increases.

Notice that this effect is driven by the presence of types who acquire the firm through a tender offer (unless  $\varphi \in (0, \alpha/(1 + \alpha)]$ , in which case tender offers do not take place). Without the possibility of a tender offer, all control transfers would be block trades at the price equal to the incumbent's valuation of his block,  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ , and they would occur if and only if  $X > \bar{X}/2$  (just like for  $\varphi \in (0, \alpha/(1 + \alpha)]$  in our equilibrium). Then,  $\varphi$  would have no effect on the average quality of acquirers ever. With the possibility of tender offers, the increase in the equilibrium bid price due to a decrease in  $\varphi$  puts upward pressure on  $p^*$ , so that it does not decrease as strongly as  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  and may even increase as  $\varphi$  falls (see the brief discussion right after Proposition 1). As a result, the threshold on  $X$  above which block trades occur increases rather than remains fixed, and the average quality of all types who acquire control goes up.

Notice also that the possibility of acquiring control through a block trade ensures that efficient control transfers always take place. In the absence of the mandatory bid rule the acquirer can always purchase only the incumbent's block if she wishes. Since the block price does not exceed the incumbent's valuation of the block, a block trade always yields a positive payoff to the raider when she values the block more than the incumbent, which is equivalent to the acquirer being more efficient than the incumbent in the model. Along the lines of At, Burkart, and Lee (2011), one can easily show that without the possibility of block trades, a too strong shareholder protection would kill some efficient takeovers in my setup. Thus, an important caveat is that the efficiency implications of shareholder protection in my model are confined to firms with a large non-controlling shareholder.

Proposition 3 also implies that takeovers become less likely as shareholder protection improves. This may sound at odds with the common observations that takeovers, and especially tender offers, are more widespread in countries with better shareholder protection. However, it is important to keep in mind that the proposition is formulated for given  $\alpha$ , while firms from countries with weaker legal environments normally have more concentrated ownership structures. If we increase  $\varphi$  and  $\alpha$  jointly, the direction of a change in  $X'$  and  $X''$  is ambiguous, because both thresholds increase with  $\alpha$ . It is equally ambiguous how the condition  $\varphi \geq \alpha/(1 + \alpha)$  is affected. Moreover, if  $\alpha$  reaches 50%, which is not rare in weak legal environments, making a takeover without the consent of the incumbent blockholder is simply impossible (if  $\alpha > 50\%$ , only block trades can occur, and they will whenever  $X > \bar{X}/2$ , that is, not more often than in countries with strong shareholder protection in our model).

The result that the market for corporate control is more efficient in countries with better legal protection of investors is also obtained in Burkart et al (2012). However, in their model the rationale for such a result is totally different. In Burkart et al (2012), stronger investor protection increases the pledgeable income of the bidder, thereby reducing the role of internal funds in financing a takeover. As a result, as investor protection improves, bidder's efficiency as opposed to availability of internal funds becomes more important in determining the winner in a takeover contest.

Let us now consider the effect of the mandatory bid rule. The rule is immaterial in my setup if the threshold for a mandatory bid is above  $\alpha$ . Thus, let us assume that the threshold is below  $\alpha$ , so that acquiring the incumbent's stake triggers a mandatory bid to the remaining shareholders at the price of the block trade.

With the mandatory bid rule, there can be three possible types of equilibria. In an equilibrium of the first type, all types below certain  $X_{TO}$  abstain, while all types above  $X_{TO}$  acquire the entire company at price  $b^* \leq (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . In an equilibrium of the second type, all types below certain  $X_{BT}$  abstain, while all types above  $X_{BT}$  purchase only the incumbent's share at  $p^* = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . In an equilibrium of the third type, all types below certain  $\tilde{X}$  abstain, while all types above  $\tilde{X}$  purchase the incumbent's share at  $p^* = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  and some share of the dispersed equity.

In the first type of equilibrium,  $b^*$  cannot be above the incumbent's valuation of the block,  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . If it were, there would be bidders with  $(1 - \varphi)X < b$ , who would profit by deviating and offering  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  (the incumbent would agree to sell at this price).

In the second type of equilibrium, the dispersed shareholders do not tender for  $p = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  because they believe that  $E\left[(1 - \varphi)X \mid p = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}\right] > (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ .

In the third type of equilibrium, the dispersed shareholders are indifferent between tendering and not because they believe that  $E\left[(1 - \varphi)X \mid p = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}\right] = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . However, in contrast to the setup without the MBR, now "not tendering" is *not* a weakly dominated strategy for a small shareholder, because at the moment of his tendering decision the transfer of control has already occurred through a block trade, and, hence, the shareholder's payoff does not depend on strategies of other small shareholders.

There cannot be equilibria in which, among those types who acquire control, some types just purchase a block at  $p$ , while other types acquire the whole company at  $b$ . Imagine such an equilibrium exists. Then, first, it must be that  $p > b$ , otherwise some of the types who acquire the whole company would gain from purchasing the block at  $p$  instead. Second, it must be that the dispersed shareholders reject the mandatory offer at price  $p$ . Furthermore, as we know from Lemma 5, all types who acquire 100% must have higher  $X$  than any of the types who just buy the block. But then, given that the dispersed shareholders tender at price  $b$ , they would not reject a mandatory offer at price  $p$ , since this price should exceed the expected security benefits generated by a type who offers  $p$ .

**Lemma 10** *Under the mandatory bid rule, an equilibrium, satisfying the credible beliefs criterion, in which all types with  $X \in [0, X_{TO}]$  abstain, and all types with  $X \in (X_{TO}, \bar{X}]$  acquire the whole company, exists if and only if  $\varphi \geq \frac{\sqrt{8\alpha+1}-2\alpha-1}{2-2\alpha} \equiv \varphi_{TO}$ . The equilibrium of this type is unique for all  $\varphi \geq \varphi_{TO}$ , and in this equilibrium  $X_{TO} = b^* = (1 - \varphi)\bar{X}/(1 + \varphi)$ . Moreover,  $\varphi_{TO} < \alpha/(1 + \alpha)$ .*

**Proof.** See the Appendix. ■

**Lemma 11** *Under the mandatory bid rule, an equilibrium, in which all types with  $X \in [0, X_{BT}]$  abstain, and all types with  $X \in (X_{BT}, \bar{X}]$  purchase only the incumbent's share, exists if and only if  $\varphi \leq \alpha/(2 + \alpha) \equiv \varphi_{BT}$ . The equilibrium of this type is unique for all  $\varphi \leq \varphi_{BT}$ . In this equilibrium  $X_{BT} = \bar{X}/2$ , and  $p^* = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ , and the credible beliefs criterion is satisfied. Moreover,  $\varphi_{BT} < \varphi_{TO}$  from Lemma 10.*

**Proof.** See the Appendix. ■

**Lemma 12** *Under the mandatory bid rule, an equilibrium, satisfying the credible beliefs criterion, in which all types with  $X \in [0, \tilde{X}(\beta)]$  abstain, and all types with  $X \in (\tilde{X}(\beta), \bar{X}]$  purchase share  $\beta \in (\alpha, 1)$ , including the entire incumbent's stake, exists if and only if  $\varphi = \tilde{\varphi}(\beta)$ , where  $\tilde{\varphi}(\beta)$  is a continuous strictly increasing function, taking value  $\varphi_{BT}$  from Lemma 11 at  $\beta = \alpha$  and  $\varphi_{TO}$  from Lemma 10 at  $\beta = 1$ . The equilibrium of this type is unique for any  $\varphi \in (\varphi_{BT}, \varphi_{TO})$ . Threshold  $\tilde{X}(\beta)$  is a continuous strictly increasing function that takes values  $X_{BT}$  and  $X_{TO}$  from Lemmas 11 and 10 at  $\beta = \alpha$  and  $\beta = 1$  respectively, and  $p^* = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ .*

**Proof.** See the Appendix. ■

It follows from Lemma 12 that for any  $\varphi \in (\varphi_{BT}, \varphi_{TO})$  there exist a unique equilibrium, in which the share acquired by the raider is a strictly increasing continuous function of  $\varphi$ :  $\beta(\varphi) = \tilde{\varphi}^{-1}(\varphi)$ . Correspondingly, the threshold  $\tilde{X}(\beta)$  can also be represented as a strictly increasing continuous function of  $\varphi$ :  $\tilde{X}(\varphi) = \tilde{X}(\beta(\varphi))$ .

Let us summarize the results of Lemmas 10-12. When  $\varphi < \varphi_{BT}$ , a transfer of control occurs whenever  $X > \bar{X}/2$ . When  $\varphi \in (\varphi_{BT}, \varphi_{TO})$ , the transfer of control occurs whenever  $X > \tilde{X}(\varphi)$ , where  $\tilde{X}(\varphi)$  is a continuous strictly increasing function with  $\tilde{X}(\varphi_{BT}) = \bar{X}/2$  and  $\tilde{X}(\varphi_{TO}) = X_{TO} \equiv (1 - \varphi)\bar{X}/(1 + \varphi) > \bar{X}/2$  (for any  $\varphi \in (\varphi_{BT}, \varphi_{TO})$ ). When  $\varphi > \varphi_{TO}$ , a transfer of control occurs whenever  $X > X_{TO}$ .

Now we can compare efficiency of control transfers with and without the MBR. First, notice that  $X_{TO} > X'$  for any  $\varphi \in (0, 1)$ . Second,  $X_{TO} > \bar{X}/2$  whenever  $\varphi < 1/3$ . There are five distinct zones, depicted in Figure 2. When legal protection is very bad, i.e., when  $\varphi > 1/3$ , the MBR unambiguously raises efficiency, as the set of types who acquire control shrinks from  $(X', \bar{X}]$  to  $(X_{TO}, \bar{X}]$  with  $X_{TO} < \bar{X}/2$ , that is, we only lose inefficient takeovers.

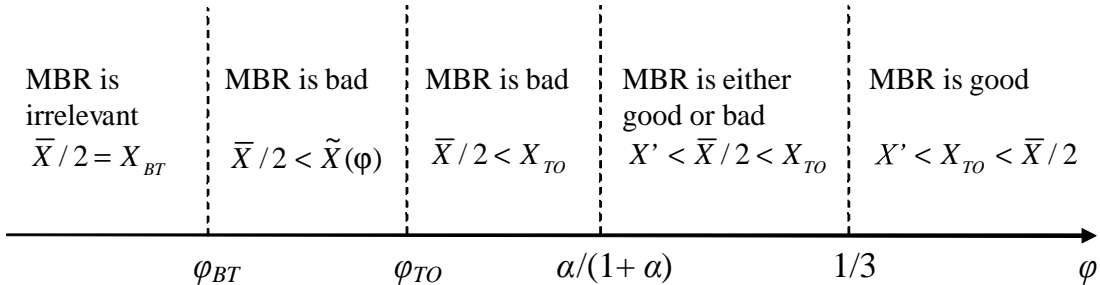


Figure 2. Mandatory bid rule and efficiency.

When shareholder protection becomes better,  $\varphi \in (\alpha/(1 + \alpha), 1/3)$ , the MBR kills also some efficient control transfers, as  $X_{TO} > \bar{X}/2$  in this zone. This negative effect is due to the fact that for  $\varphi > \varphi_{BT}$  the MBR kills block trades. Without the possibility of acquiring control

through a block trade, the asymmetry of information makes types that are not high enough overpay for 100% of the shares. As a result, when private benefits are not sufficiently high ( $\varphi < 1/3$ ), even for some of the raiders who are more efficient than the incumbent a takeover through a tender offer becomes unprofitable. Thus, for  $\varphi \in (\alpha/(1 + \alpha), 1/3)$ , the impact of the MBR on efficiency is generally ambiguous. However, it is clear that the “net” effect of the MBR gradually changes from positive to negative as  $\varphi$  falls. Since  $X_{TO}$  grows with a decrease in  $\varphi$ , more and more efficient raiders abstain from a takeover after the introduction of the MBR. At the same time, the positive effect (prevention of inefficient takeovers) diminishes, because fewer takeovers remain inefficient without the MBR.

For  $\varphi \in (\varphi_{TO}, \alpha/(1 + \alpha))$  the MBR is unambiguously bad for efficiency. In this zone, without the MBR a takeover takes place if and only if it is efficient, while with the MBR some efficient control transfers do not occur, as  $X_{TO} > \bar{X}/2$ .

When  $\varphi \in (\varphi_{BT}, \varphi_{TO})$  the effect of the MBR continues to be unambiguously negative, but the efficiency loss diminishes as  $\varphi$  decreases, because  $\tilde{X}(\varphi)$  is an increasing function (i.e., more takeovers occur as  $\varphi$  falls). This is because now the raider does not have to acquire 100% of the company, and, hence, is to a lesser extent affected by the information asymmetry. Moreover,  $\beta$  falls with a decline of  $\varphi$ , so the effect of information asymmetry diminishes further, and more and more types can afford a takeover.

Finally, when  $\varphi \in (0, \varphi_{BT})$ , the MBR does not prevent pure block trades, because the price of the block becomes so low that small shareholders are not willing to tender their shares in response to a mandatory bid. Hence, in this zone the MBR is irrelevant for efficiency. The above analysis can be summarized in the following proposition

**Proposition 4** *For firms with a dominant minority shareholder, the positive effect (preventing inefficient takeovers) of the mandatory bid rule on takeover efficiency prevails over the negative effect (impeding efficient takeovers) when shareholder protection is sufficiently weak. However, when shareholder protection becomes strong enough, but not too strong, the negative effect of the mandatory bid rule prevails. When shareholder protection is very strong, the rule is irrelevant. Hence, whereas the mandatory bid rule promotes takeover efficiency under weak shareholder protection, it does not promote and can be detrimental for takeover efficiency when shareholder protection is strong.*

### 5.3 Stock price reaction and takeover premium: effects of shareholder protection

Proposition 2 has already established one implication for stock price reactions to block trades and tender offers. In order to derive the effect of shareholder protection on the announcement returns, it is necessary to make assumptions about the pre-announcement market expectations. I will consider the two polar cases: one in which the deal is totally unanticipated by the market and one in which the market is fully aware that the acquirer with  $X$  distributed uniformly on  $[0, \bar{X}]$  is already “around”.<sup>25</sup>

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<sup>25</sup>It may seem that the former case requires irrationality on the part of investors. However, a “fully unexpected deal” can be rationalized by assuming that an acquirer with available funds appears only with some probability, and, when she appears, her  $X$  is uniformly distributed on  $[0, \bar{X}]$ . If the probability of appearance is close to zero, the deal will be almost unexpected. It turns out that the qualitative results do not depend on whether the deal is fully unexpected or not.

Notice that in our model there is no difference between the takeover premium and the stock price reaction in the case of a tender offer, because the acquirer pays the expected post-takeover security benefits and all tender offers succeed with certainty in equilibrium.

**Proposition 5** *Regardless of whether the deal is totally unanticipated or not, for a given incumbent blockholder's share:*

- *the target's stock price reaction to a tender offer and the takeover premium are higher in countries with stronger shareholder protection,*
- *the target's stock price reaction to a block trade announcement is higher in countries with stronger shareholder protection.*

**Proof.** Let us denote the pre-announcement stock price by  $q_0$ , and the post-announcement stock price – by  $q_1$ . Consider first the case when the deal is totally unexpected. In this case, the pre-takeover target's stock price is  $q_0 = (1 - \varphi)\bar{X}/2$ . Following a tender offer, the price jumps to the post-takeover value of security benefits:  $q_1 = (1 - \varphi)(X'' + \bar{X})/2$ . The change in the stock price relative to the pre-takeover value is  $\Delta q/q_0 = q_1/q_0 - 1 = \frac{X'' + \bar{X}}{\bar{X}} - 1 = X''/\bar{X}$ . Since  $X''$  decreases with  $\varphi$ , the stock price reaction decreases with  $\varphi$ , i.e., increases with the quality of shareholder protection.

Similarly, following a block trade announcement, for  $\varphi \in (\alpha/(1 + \alpha), 1)$  the the price jumps to  $q_1 = (1 - \varphi)(X' + X'')/2$ ,  $\Delta q/q_0 = \frac{X' + X''}{\bar{X}} - 1$ . Since both  $X'$  and  $X''$  decrease with  $\varphi$ , the stock price reaction decreases with  $\varphi$  as well.

Now let us consider the case when the market is aware of the presence of an acquirer and rationally assign positive probabilities to both a block trade and a tender offer. Then, the pre-announcement target's stock price is a weighted sum of the incumbent's security benefits, the expected block purchaser's security benefits, and the tender offer bid:

$$\begin{aligned} q_0 &= \frac{X'}{\bar{X}}(1 - \varphi)\frac{\bar{X}}{2} + \frac{X'' - X'}{\bar{X}}(1 - \varphi)\frac{X' + X''}{2} + \frac{\bar{X} - X''}{\bar{X}}(1 - \varphi)\frac{X'' + \bar{X}}{2} = \\ &= \frac{X'}{\bar{X}}(1 - \varphi)\frac{\bar{X}}{2} + \frac{\bar{X} - X'}{\bar{X}}(1 - \varphi)\frac{X' + \bar{X}}{2}. \end{aligned}$$

Then, using the expressions for  $X'$  and  $X''$ , in the case of a tender offer

$\Delta q/q_0 = \frac{4(1 + y)}{2(1 + y) + (1 - y)(1 + y) + 1} - 1$ , where  $y = \frac{1 - \varphi}{1 - \alpha + \alpha\varphi}$ . For  $\varphi \in (\alpha/(1 + \alpha), 1)$ ,  $y$  is below 1. Then,  $\Delta q/q_0$  is increasing in  $y$ , and, hence, decreasing in  $\varphi$ .

Similarly, in the case of a block trade for  $\varphi \in (\alpha/(1 + \alpha), 1)$  one can derive  $\Delta q/q_0 = \frac{3y}{2 + y - (1/2)y^2}$ , which is increasing in  $y$ , and, hence, decreasing in  $\varphi$ .

When  $\varphi \leq \alpha/(1 + \alpha)$  only block trades occur and they occur whenever  $X > \bar{X}/2$  regardless of  $\varphi$ ; hence the stock price reaction is insensitive to shareholder protection in this zone, regardless of whether the deal is totally unanticipated or not. ■

Rossi and Volpin (2004) have found that takeover premiums are higher in countries with better legal protection of shareholders. They suggested two potential explanations. First, better investor protection lowers the cost of capital and, therefore, leads to more competition between bidders, which drives up the premium. Second, countries with stronger shareholder protection



have more dispersed ownership, which results in a greater free-rider problem among target shareholders and, hence, a higher bid price.

My model provides an alternative explanation for this finding. The basic intuition behind Proposition 5 stems from the result that in better legal regimes both tender offers and block trades are implemented by better quality acquirers on average. Hence, in the “fully unexpected deal” scenario, the stock price reaction to both tender offers and block trades is trivially higher in better legal regimes. In the “partially expected deal” scenario the logic is a bit more complicated, because the pre-announcement price incorporates the change in the pool of successful acquirers due to improved shareholder protection. However, the effect of the change in the average quality of acquirers on the post-announcement price is naturally stronger, so the ultimate effect of shareholder protection on the stock price reaction remains positive.

It should be noted that Proposition 5 is about within-country takeovers rather than cross-boarder deals. When studying the announcement target’s returns, Rossi and Volpin (2004) do not distinguish between cross-boarder and domestic takeovers. They, however, find no effect of the difference between the acquirer and target countries’ shareholder protection on the announcement returns. Bris and Cabolis (2008) do not find any statistically significant effect of the target country’s shareholder protection, but their empirical specifications do not allow to estimate the effect of shareholder protection for domestic deals separately from cross-boarder deals. Instead, their study focuses on the effects of the difference in shareholder protection between the acquirer’s and target’s countries.<sup>26</sup>

Cross-country research on wealth effects of block trades is much scarcer. Liao (2010) finds no statistically significant effect of shareholder protection on stock price reaction to block trades, but, again, the study does not estimate the effect of the target country’s legal institutions for domestic deals separately.<sup>27</sup> Thus, additional empirical research is needed to test Proposition 5.

## 6 Robustness

In this section I consider two modifications of the model. The first one allows for a counter offer by the incumbent. The second considers what happens if security benefits and private benefits are not positively correlated. I show that my results are reasonably robust to these modifications. In particular, the possibility of a counter offer does not change the results of the model in any way (but would change them somewhat if I assumed that  $X_I > \bar{X}/2$ ), and the qualitative results of the model remain intact if private benefits are independent of security benefits (and even if they are negatively correlated, provided that private benefits are not too “sensitive” to security benefits).

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<sup>26</sup>There is also a study by Goergen and Renneboog (2004) who obtain that UK targets experience significantly greater returns than targets from Continental Europe.

<sup>27</sup>There are several studies devoted to a specific country, rather than doing cross-country comparisons. The average stock price reaction to block trades documented for Germany (Franks and Mayer, 2001), France (Banejee et al., 1998) and Poland (Trojanowski, 2008) is lower than that found in the U.S. studies (Barclay and Holderness, 1991; Kang and Kim, 2008; Allen and Phillips, 2000).

## 6.1 Countering by the incumbent

Assume that at  $t = 2$ , after observing the raider's bid, the incumbent can launch a counter-bid. The dispersed shareholders then decide to whom to tender their shares (not tendering at all remains an option, of course). Let us assume that when dispersed shareholders are indifferent between tendering to the raider and tendering to the incumbent, they tender to the raider.

The possibility of a bid contest increases the price the raider has to pay in order to gain control. In the symmetric information case, this will lead both to a greater likelihood that a block trade is strictly preferred to a tender offer and to a lower likelihood of a control transfer. To see this, assume the dispersed shareholders would tender at price  $b$  to the raider if the incumbent does not overbid. The incumbent will decide to overbid (and acquire  $1 - \alpha$  shares) rather than sell to the raider whenever

$$(1 - \varphi)\frac{\bar{X}}{2} + \varphi\frac{\bar{X}}{2} - (1 - \alpha)b > \alpha b,$$

or

$$b < \frac{\bar{X}}{2}$$

Hence, in order to succeed in a tender offer, the raider will have to bid at least  $\bar{X}/2$ .

It can be shown that the threat of countering will modify Lemma 1 in the following way. For  $X \in ((1 - \varphi)\bar{X}/2, \bar{X}/2]$  the raider will abstain from the contest, because the necessity to bid  $\bar{X}/2$  instead of  $(1 - \varphi)\bar{X}/2$  will result in a negative payoff. For  $X \in (\bar{X}/2, \frac{\bar{X}}{2(1-\varphi)}]$  the raider will launch a bid, but, having to bid  $\bar{X}/2$  instead of  $(1 - \varphi)X$ , she will obtain a lower payoff compared to Section 3. These changes, in turn, lead to the following changes in Lemma 2: for  $X \in ((1 - \varphi)\bar{X}/2, \bar{X}/2]$  there will be no transfer of control at all, and for  $X \in (\bar{X}/2, \frac{\bar{X}}{2(1-\varphi)}]$  the raider, rather than being indifferent as in the baseline model, now strictly prefers a block trade, because in a tender offer she would have to pay more than the security benefits she would generate.

Consider now the case of asymmetric information. Whenever  $b^*$  from Section 4 exceeds  $\bar{X}/2$ , the possibility of counterbidding does not change anything, because the incumbent would stay passive. Using the expression for  $b^*$ , condition  $b^* > \bar{X}/2$  becomes

$$\frac{(1 - \varphi)(2 - \alpha - \varphi + \alpha\varphi)}{2(1 - \alpha + \alpha\varphi)}\bar{X} > \frac{\bar{X}}{2}$$

It can be easily shown that this condition holds for all  $\varphi < 1$ . Thus, adding the possibility of counterbidding to our setup does not lead to effective competition for the target under asymmetric information, and all the results of the model remain intact.

One of the implications of this subsection is that bid competition is less effective under asymmetric information about the raider's ability, provided that the incumbent's ability is not too high relative to the distribution of the raider's one. This conclusion would also hold in a model without the possibility of block trades (like the one of At, Burkart, and Lee, 2011). The thing is that for low enough types, who would have to compete with the incumbent if their type were common knowledge, the asymmetry of information already raises the bid they have to offer above the security benefits they can create. If the incumbent's value is not too high, this bid increase simply deters competition. Essentially, instead of competing with the incumbent, low

types of raiders have now to “compete” with the information asymmetry.

If we modify the model by assuming that the incumbent creates value  $X_I > \bar{X}/2$ , effective competition would arise for large enough  $\varphi$ , let us call this threshold  $\varphi_{EC}$ . For  $\varphi < \varphi_{EC}$  the solution would be similar to the solution of Section 4, while for  $\varphi > \varphi_{EC}$  the raider would have to bid  $X_I$  regardless of  $\varphi$ . However, the tender offer zone would arguably still exist, though its size would be likely to diminish with respect to the no-competition model, since the raider would have to offer a higher bid.

## 6.2 No positive correlation between security benefits and private benefits

In the basic model, security benefits  $(1 - \varphi)X$  and private benefits  $\varphi X$  are perfectly positively correlated. This corresponds to the situation when all raiders have the same propensity to steal value but different ability to generate value. An alternative assumption would be that raiders differ in their propensity to steal, while having the same ability to generate value. This would yield a negative correlation between security benefits and private benefits. Below I examine the intermediate case, in which private benefits are independent of security benefits and argue that the qualitative results of the model do not change. After that I briefly discuss the case of negative correlation and argue that when private benefits are not too sensitive to security benefits, the equilibrium with tender offers should survive.

Imagine that  $X$  is not the whole value but just security benefits, distributed uniformly on  $[0, \bar{X}]$ . Imagine also that private benefits are deterministic<sup>28</sup> and the same for all types of raiders and the incumbent. I denote their value by  $B$ . As in the basic model, assume that  $X_I = \bar{X}/2$ . Finally, assume that  $B \leq \bar{X}/2$ .<sup>29</sup>

The crucial thing to notice is that in this modified model the raider’s payoffs from both a block trade and a tender offer are increasing linear functions of  $X$ , with the tender offer payoff being a steeper function, just like in the baseline model. Indeed, the raider’s payoff from a block trade is  $\alpha(X - p) + B$ , whereas her payoff from acquiring 100% of shares is  $X + B - b$ . Intuitively, this will give rise to the same equilibrium structure as in the baseline model. Just as in the baseline model, one can construct an equilibrium with thresholds  $X'$  and  $X''$ <sup>30</sup>, in which types with  $X \in [0, X']$  abstain from any transaction, types with  $X \in (X', X'']$  purchase the block, and types with  $X \in (X'', \bar{X}]$  acquire the entire company by means of a tender offer. In fact one could simply look at Figure 1 for the illustration of the equilibrium (just the payoff expressions have to be changed). The equilibrium bid  $b^*$  will be equal to  $(X'' + \bar{X})/2$ . Just as in Section 4, it will be smaller than the equilibrium block trade price  $p^*$ , which, in turn, will be lower than the incumbent’s valuation (per unit share) of his block,  $\bar{X}/2 + B/\alpha$ . If the incumbent rejects  $p^*$ , raiders from  $(X', \hat{X}]$  would abstain, while types from  $(\hat{X}, X'']$  would launch a tender offer at  $b^*$ . Price  $p^*$  will make the incumbent just indifferent between accepting and rejecting the private offer.

One can show that such an equilibrium will exist whenever  $B \in [\alpha\bar{X}/2, \bar{X}/2]$ , and that this

<sup>28</sup>I could also make them stochastic – the important thing for what follows is that they must be independent of security benefits and there must not be information asymmetry about them.

<sup>29</sup>This assumption is made due to problems with equilibrium selection for  $B > \bar{X}/2$ . It turns out that for such value of  $B$  an equilibrium satisfying the credible beliefs criterion does not exist. Instead, there is a continuum of equilibria, in which the only mode of control transfer is a tender offer, but the bid exceeds the expected post-takeover security benefits.

<sup>30</sup>All derivations for this subsection are available upon request from the author.

equilibrium will be the only equilibrium in this zone, satisfying the credible beliefs criterion. Just as it was in Section 4 for low enough private benefits, for  $B < \alpha\bar{X}/2$  the only equilibrium will be the one in which types with  $X \in [0, \bar{X}/2]$  abstain, and types with  $X \in (\bar{X}/2, \bar{X}]$  purchase the incumbent's block at the price equal to the incumbent's valuation of the block. Furthermore, the change from one type of equilibrium to the other will be continuous at  $B = \alpha\bar{X}/2$ .

The stock price and efficiency implications will be the same as those of the baseline model. Since tender offers are made by higher quality acquirers, they will produce a higher price jump compared with block trades. An increase in shareholder protection can be modelled via a decrease in  $B$ .<sup>31</sup> One can then show that lowering  $B$  moves both  $X'$  and  $X''$  to the right until, at  $B = \alpha\bar{X}/2$ ,  $X'$  becomes  $\bar{X}/2$ . So, the effects of shareholder protection on efficiency, takeover premium and the stock price reactions will be the same as in Section 5.

Now let us introduce a negative correlation between private benefits and security benefits. Specifically, assume that rather than being fixed, private benefits equal  $B - \gamma X$ , where  $X$  is security benefits as before, and  $\gamma$  measures "sensitivity" of private benefits to security benefits (the correlation is  $-1$ , of course). In particular,  $\gamma = 0$  corresponds to the just discussed case, where private benefits were fixed at  $B$ . It is almost obvious that for small enough  $\gamma$ , the conclusions of the model should not qualitatively change with respect to the case of fixed private benefits (by continuity).

However, if  $\gamma$  is large enough, equilibria with tender offers may disappear completely. To illustrate this, assume  $\gamma = 1$ . Then, the raider's payoff from a block trade is  $\alpha(X - p) + B - X = -(1 - \alpha)X + B - \alpha p$ , and her payoff from acquiring the whole company is  $X + B - X - b = B - b$ . Look at Figure 3. The block trade payoff is now downward sloping, while the tender offer payoff is just a horizontal line. That means if we want to have tender offers, the former line has to lie above zero. But then there will be no abstainers if the incumbent rejects the private deal. This means that, in an equilibrium with both block trades and tender offers, the block price has to be equal to the tender offer bid,  $p^* = b^*$ . Indeed, any  $p^* < b^*$  will be rejected by the incumbent, whereas any  $p^* > b^*$  is suboptimal for the raider. But then, in order for the raider with  $X = X''$  to be indifferent between the tender offer and the block trade it must be that

$$B - b^* = -(1 - \alpha)X'' + B - \alpha b^*,$$

which yields

$$b^* = X''$$

However, this is impossible since it must be that  $b^* \geq (X'' + \bar{X})/2$ .

Equilibria with tender offers by all types are equally impossible. For any  $b$ , a type with low enough  $X$  could offer  $p$  slightly higher than  $b$  (which would clearly be accepted by the incumbent) and gain:  $-(1 - \alpha)X + B - \alpha b > B - b$  holds for small enough  $X$ .

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<sup>31</sup>Perhaps it would be more realistic to assume that in addition to a decrease in  $B$ , better law increases  $X$ . However, this alternative assumption would produce the same results.

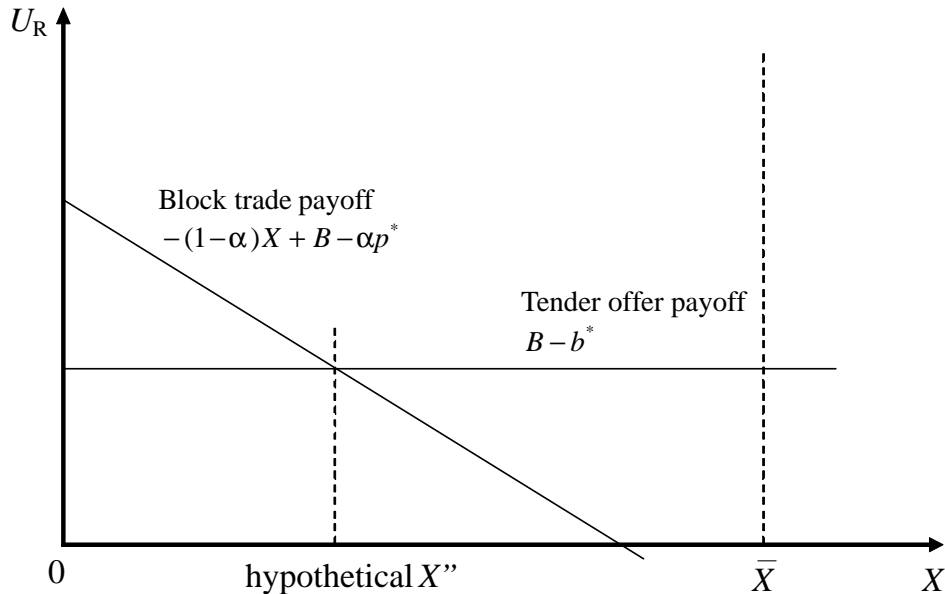


Figure 3. Hypothetical (non-existent) equilibrium when private benefits change one-for-one with security benefits.

## 7 Conclusion

I have developed a model that rationalizes the existence of both block trades and tender offers in equilibrium in firms with a dominant minority blockholder. Thus, in contrast to the previous literature, the model explains why we observe both types of control transfers in such companies. The paper suggests that the choice between a block trade and a tender offer is affected by the acquirer's ability to generate value in the target firm: among those types who acquire control, higher ability acquirers launch a tender offer and lower ability ones negotiate a block trade with the incumbent blockholder. The model provides a number of implications. First, the paper offers a simple explanation for an empirically observed higher announcement returns of targets in tender offer deals as compared to negotiated block trades. Second, the model predicts higher takeover premiums and targets' announcement returns in both domestic tender offers and domestic block trades in countries with better shareholder protection. While my result on takeover premiums is consistent with the empirical findings of Rossi and Volpin (2004), further empirical research is needed to test my predictions. The model also obtains that stronger shareholder protection improves the efficiency of control transfers. A similar result is obtained in Burkart et al (2012), but their rationale is totally different from mine. Finally, I provide an argument against the mandatory bid rule in strong legal regimes. While raising the efficiency of takeovers through preventing inefficient takeovers under weak shareholder protection, the mandatory bid rule can harm takeover efficiency under strong shareholder protection through impeding efficient takeovers. A caveat is that the efficiency implications of my model are confined to firms with a large minority shareholder, in which control can be transferred by means of a block trade.

A general direction for future research is to continue exploring how various types of information asymmetry can affect the mode of the control transfer. In particular, the incumbent blockholder may also possess some private information about the value of the target's assets, especially in innovative firms where a firm's insiders (including large shareholders) have naturally

better knowledge about potential success of the firm's R&D projects. Another interesting task would be to explain the choice between friendly and hostile takeovers in firms with dispersed ownership. Similarly to the present model, hostile takeovers may arise there due to bargaining imperfections caused by information asymmetries, but bargaining in such firms is usually between a potential acquirer and the target's board of directors. In this respect, the role of public and private communication between the potential acquirer, the target's management, board of directors and shareholders is potentially very important and worth studying.

## Appendix

**Proof of Lemma 6.** Suppose there are types who acquire only the incumbent's block in a tender offer. The bid offered by these types cannot be less than the incumbent's valuation of his block,  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ , for if it were, the incumbent would obviously reject the bid (since other shareholders do not tender, he is pivotal to the outcome of the takeover). But then the raider could buy the incumbent's stake in a privately negotiated deal by offering  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  (per unit share), because by refusing the incumbent would obtain a weakly lower payoff (and we have assumed that in case of indifference at the negotiation stage the incumbent sells the block).

Indeed, if the raider abstains following the refusal, the incumbent remains in control with payoff  $\alpha(1 - \varphi)\bar{X}/2 + \varphi\bar{X}/2$ . If the raider goes for a tender offer after the refusal, she will not bid more than  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . To see this, imagine she bids  $b > (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . This could be optimal only if she hopes to make a profit on purchasing the shares of dispersed shareholders, for if only the incumbent tenders, it would be sufficient to bid just  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . However, in order for dispersed shareholders to agree to sell, it must be that  $b \geq E((1 - \varphi)X \mid bid = b)$ , that is, the bid must not be below the shareholders' expectation about the security benefits the raider would generate, just as in the case of symmetric information. This means, however, that at least for some types of raiders among those who bid  $b$ ,  $b \geq (1 - \varphi)X$ . This, in turn, implies that these types weakly lose from buying the dispersed shares and would prefer to bid  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2} < b$  even if that results in purchasing only the incumbent's share. Formally, for these types,  $\alpha[(1 - \varphi)X - b] + \varphi X < \alpha\left[(1 - \varphi)X - (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}\right] + \varphi X$ .

Hence, indeed, the raider could buy the incumbent's block in a negotiated trade at  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . Given Assumption 4, we conclude that the raider would do that, which proves the statement of the lemma. ■

**Proof of Lemma 7.** The acquirer obtains  $X - b$  as a result of a tender offer and  $\alpha[(1 - \varphi)X - p] + \varphi X$  after a block trade. In the equilibrium under consideration type  $X'$  must be indifferent between doing a block trade and abstaining:

$$\alpha[(1 - \varphi)X' - p^*] + \varphi X' = 0 \tag{1}$$

Similarly, type  $X''$  must be indifferent between a block trade and a tender offer:

$$X'' - b^* = \alpha[(1 - \varphi)X'' - p^*] + \varphi X'',$$

or

$$(1 - \varphi)X'' - b^* = \alpha [(1 - \varphi)X'' - p^*] \quad (2)$$

Due to the free-rider problem of dispersed shareholders, bid  $b^*$  must be greater or equal to the expected post-takeover security benefits generated by the acquirer, where the expectation is rationally taken over types  $[X'', \bar{X}]$ :

$$b^* \geq (1 - \varphi) \frac{X'' + \bar{X}}{2} \quad (3)$$

As in Shleifer and Vishny (1986) and At, Burkart, and Lee (2011), applying the Grossman and Perry (1986) credible beliefs concept results in

$$b^* = (1 - \varphi) \frac{X'' + \bar{X}}{2} \quad (4)$$

Let us show this. From (2)  $X'' = (b^* - \alpha p^*) / [(1 - \varphi)(1 - \alpha)]$ . Then, (3) can be rewritten as

$$b^* \geq (1 - \varphi) \frac{(b^* - \alpha p^*) / [(1 - \varphi)(1 - \alpha)] + \bar{X}}{2} \equiv f(b^*)$$

Denote the (unique) value of  $b^*$  at which  $b^* = f(b^*)$  by  $\tilde{b}^*$ . Obviously, at this value of  $b^*$  (4) holds; denote the corresponding value of  $X''$  by  $\tilde{X}''$ . It is straightforward that  $b^* > f(b^*)$  (equivalently,  $b^* > (1 - \varphi)(X'' + \bar{X})/2$ ) when  $b^* > \tilde{b}^*$  and  $b^* < f(b^*)$  (equivalently,  $b^* < (1 - \varphi)(X'' + \bar{X})/2$ ) when  $b^* < \tilde{b}^*$ . when  $b^* > \tilde{b}^*$  and  $b^* < f(b^*)$  when  $b^* < \tilde{b}^*$ .

Now, suppose that  $b^* > (1 - \varphi)(X'' + \bar{X})/2$  in equilibrium, which automatically implies  $b^* > \tilde{b}^*$  and  $X'' > \tilde{X}''$  (the latter follows the fact that, for given  $p^*$ ,  $X''$  is a strictly increasing function of  $b^*$ , as follows from (2)). Consider a deviation of the acquirer to  $\tilde{b}^*$ . Provided that such bid is accepted, all types belonging to  $[\tilde{X}'', \bar{X}]$  would want to deviate to  $\tilde{b}^*$ , and no type from  $[0, \tilde{X}'')$  want to deviate to  $\tilde{b}^*$ . At the same time, if the dispersed shareholders believe that  $X \in [\tilde{X}'', \bar{X}]$ , they would indeed accept  $\tilde{b}^*$ . Thus, the Grossman and Perry (1986) equilibrium concept imposes that upon observing  $\tilde{b}^*$ , the dispersed shareholders must believe that  $X \in [\tilde{X}'', \bar{X}]$ , and will, therefore, accept  $\tilde{b}^*$ . Hence, no equilibrium with  $b^* > (1 - \varphi)(X'' + \bar{X})/2$  satisfies the credible beliefs criterion.

Consider now  $b^* = \tilde{b}^* \equiv (1 - \varphi)(\tilde{X}'' + \bar{X})/2$  and imagine a deviation to a lower  $b$ . Given that  $X''$  is defined by (2) for any arbitrary  $b$ , if we substitute  $b^*$  with  $b$ ,  $b < \tilde{b}^*$  implies  $b < (1 - \varphi) \frac{X'' + \bar{X}}{2}$ . Hence, any bid below  $(1 - \varphi)(X'' + \bar{X})/2$  will be rejected.

There are two more conditions that needs to be satisfied in the equilibrium under consideration: the incumbent must find it optimal to accept offer  $p^*$  and reject any  $p < p^*$ . Let us first consider the optimality of accepting  $p^*$ . The incumbent must have some beliefs about what happens upon rejection of  $p^*$ . These beliefs must be consistent with the equilibrium strategy of the acquirer who makes offer  $p^*$  and gets rejected. If her offer is rejected, the acquirer rationally decides whether to abstain or to go for a tender offer. Since the negotiations between the incumbent and the acquirer are unobservable to the market, the acquirer must bid at least  $b^*$  for the tender offer to be successful (the acquirer cannot prove that her  $X$  is actually below  $X''$ ); clearly she will bid exactly  $b^*$ .

Then, an acquirer will abstain following the rejection when  $X < b^*$ , and make a tender offer when  $X \geq b^*$ . Notice that  $b^*$  must be strictly between  $X'$  and  $X''$ , because a tender offer with bid  $b^*$  yields a strictly negative payoff at  $X'$  and a strictly positive payoff at  $X''$ . Thus, conditional on offering  $p^*$  to the incumbent, the set of types who abstain following rejection is  $[X', b^*)$ , and the set of those who launch a tender offer is  $[b^*, X'')$ .

The incumbent gets  $\alpha b^*$  if the acquirer launches a tender offer, and  $\alpha(1-\varphi)\frac{\bar{X}}{2} + \varphi\frac{\bar{X}}{2}$  otherwise. Hence, the incumbent will accept  $p^*$  if and only if

$$\frac{b^* - X'}{X'' - X'} \left( \alpha(1-\varphi)\frac{\bar{X}}{2} + \varphi\frac{\bar{X}}{2} \right) + \frac{X'' - b^*}{X'' - X'} \alpha b^* \leq \alpha p^* \quad (5)$$

Finally, any price below  $p^*$  must be rejected by the incumbent, that is, for any  $p < p^*$  the following inequality must hold:

$$\mu \left( \alpha(1-\varphi)\frac{\bar{X}}{2} + \varphi\frac{\bar{X}}{2} \right) + (1-\mu)\alpha b^* > \alpha p, \quad (6)$$

where  $\mu$  is the incumbent's belief that the acquirer who offered  $p$  would abstain after rejection.

Applying the credible beliefs concept, one can show that in equilibrium

$$\frac{b^* - X'}{X'' - X'} \left( \alpha(1-\varphi)\frac{\bar{X}}{2} + \varphi\frac{\bar{X}}{2} \right) + \frac{X'' - b^*}{X'' - X'} \alpha b^* = \alpha p^* \quad (7)$$

To see how the refinement works in this case, suppose  $\frac{b^* - X'}{X'' - X'} \left( \alpha(1-\varphi)\frac{\bar{X}}{2} + \varphi\frac{\bar{X}}{2} \right) + \frac{X'' - b^*}{X'' - X'} \alpha b^* < \alpha p^*$  in equilibrium. Let us fix  $b^*$  and ignore condition (4) for the moment, so as to allow  $X''$  move with  $p^*$  according to (2). Then, for given  $b^*$ , the left hand side of the inequality does not change with changes in  $p^*$ . We can use a purely geometric argument to show this. In Figure 4 lowering  $p^*$  simply shifts the line, corresponding to the acquirer's payoff from a block trade up. Point  $D$  is the point  $X = b^*$ , i.e., the point that splits those types who abstain and those types who make a tender offer after rejection for given  $b^*$ . Segment  $AD$  is the set of those types who abstain after rejection, and segment  $DC$  is those types who go for a tender offer. After lowering  $p^*$  to some price  $p'$  the segments become  $A'D$  and  $DC'$ . Triangle  $A'B'C'$  (corresponding to price  $p' < p^*$ ) is similar to triangle  $ABC$  (corresponding to  $p^*$ ), and, since the slope of  $B'D$  is the same as the slope of  $BD$ ,  $AD/DC = A'D/DC'$ .



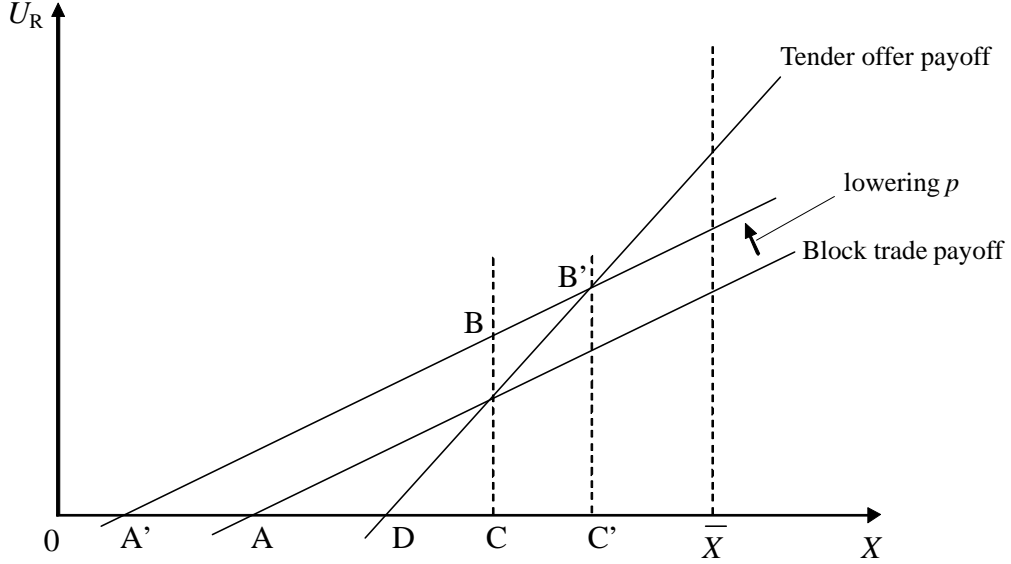


Figure 4. Application of the credible beliefs criterion for Lemma 7.

Consider now a deviation of the acquirer to  $\tilde{p}^* < p^*$  such that (7) holds. Given that the incumbent accepts such an offer, all types from segment  $A'C'$  would want to deviate to  $\tilde{p}^*$ , while all other types would not. At the same time, if the incumbent believes that an acquirer offering  $\tilde{p}^*$  belongs to  $A'C'$ , he would indeed accept the offer, since (5) still holds at  $\tilde{p}^*$ . Thus, no equilibrium with  $p^* > \tilde{p}^*$  survives the credible beliefs refinement.

In contrast, the equilibrium in which  $p^* = \tilde{p}^*$  does survive the refinement. Lowering  $p$  below  $p^*$  expands the set of acquirers who would want to deviate (to segment  $A''C''$ ), provided that  $p$  is accepted, in the same manner as when we lowered  $p^*$  to  $\tilde{p}^*$ , with the same proportions of abstainers and those who go for a tender offer following rejection ( $A''D/DC'' = A'D/DC'$ ). Therefore, (5) will cease to hold, which means that the incumbent will reject  $p$  when he believes that the raider belongs to  $A''C''$ .

Finally, for any given  $p < p^*$  there must exist belief  $\mu$  such that (6) is satisfied. There is generally a continuum of such beliefs for given  $p$ . In particular, we can set  $\mu = (b^* - X') / (X'' - X')$  for all  $p < p^*$ . Then, as follows immediately from (7), (6) holds for all  $p < p^*$ . ■

**Proof of Lemma 8.** I will first prove that for  $\varphi < 1/3$  such equilibrium does not exist even without the requirement imposed by Grossman and Perry (1986). Then I will show that whenever the “richest” equilibrium, i.e., the one defined in Lemma 7, exists, any equilibrium without block trades does not satisfy the credible beliefs criterion. As we have seen, the equilibrium from Lemma 7 exists if and only if  $\varphi \in (\alpha/(1+\alpha), 1)$ . Since  $\alpha/(1+\alpha) < 1/3$  for any  $\alpha < 1/2$ , I will then conclude that an equilibrium satisfying the credible beliefs criterion, in which no type does a block trade, exists for no value of  $\varphi$ .

Assume an equilibrium without block trades by any type exists. Then it must be characterized by some threshold  $X = X_{TO}$  such that all types with  $X \in [0, X_{TO}]$  abstain from any transaction, and all types with  $X \in (X_{TO}, \bar{X}]$  acquire 100% of the firm in a tender offer (we have proved in Lemma 6 that equilibria with tender offers such that only the incumbent tenders do not exist). Type with  $X = X_{TO}$  must be indifferent between bidding  $b^*$  and abstaining:  $X_{TO} - b^* = 0$ . As in the proof of the Lemma 7, the credible beliefs refinement requires that  $b^* = E((1 - \varphi)X | b = b^*) = (1 - \varphi) \frac{X_{TO} + \bar{X}}{2}$ . Hence, we obtain  $X_{TO} = b^* = \frac{1 - \varphi}{1 + \varphi} \bar{X}$ .

First of all, it can be easily shown that  $\frac{1-\varphi}{1+\varphi}\bar{X} > (1-\varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  whenever  $\varphi < \hat{\varphi}$ , with  $\hat{\varphi} < 1/3$ . Thus, for  $\varphi < \hat{\varphi}$ , raiders with  $X \in [X_{TO}, X_{TO}/(1-\varphi))$  will gain by bidding  $(1-\varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  and attracting just the incumbent's share.

Now suppose  $\varphi \geq \hat{\varphi}$ . It must be that no type prefers to deviate to a block trade. An acquirer prefers a block trade to abstaining whenever  $\alpha((1-\varphi)X - p) + \varphi X > 0$ . This condition must hold for all types below  $X_{TO}$ . Using the just derived expression for  $X_{TO}$ , we conclude that any price  $p < \frac{1-\varphi}{1+\varphi}(1-\varphi + \varphi/\alpha)\bar{X}$  must be rejected by the incumbent. Also, an acquirer prefers a block trade to a tender offer whenever  $\alpha((1-\varphi)X - p) + \varphi X > X - \frac{1-\varphi}{1+\varphi}\bar{X}$ . This condition must hold for all types above  $X_{TO}$ , which leads us to the same condition as above: any price  $p < \frac{1-\varphi}{1+\varphi}(1-\varphi + \varphi/\alpha)\bar{X}$  must be rejected by the incumbent.

The incumbent will reject price  $p$  whenever he thinks he will obtain more in expectation after rejection. If the incumbent rejects, either a tender offer or abstention will follow. In the former case, the incumbent will get  $ab^* = \alpha\frac{1-\varphi}{1+\varphi}\bar{X}$ . In the latter case, his payoff will be  $\alpha(1-\varphi)\frac{\bar{X}}{2} + \varphi\frac{\bar{X}}{2}$ . First, notice that  $\alpha\frac{1-\varphi}{1+\varphi}(1-\varphi + \varphi/\alpha)\bar{X} > \alpha\frac{1-\varphi}{1+\varphi}\bar{X}$  for any parameters' values. Second,  $\alpha\frac{1-\varphi}{1+\varphi}(1-\varphi + \varphi/\alpha)\bar{X} > \alpha(1-\varphi)\frac{\bar{X}}{2} + \varphi\frac{\bar{X}}{2}$  whenever  $\varphi < 1/3$ . Thus, for  $\varphi < 1/3$  there is always price  $p < \frac{1-\varphi}{1+\varphi}(1-\varphi + \varphi/\alpha)\bar{X}$  that the incumbent will accept, and, therefore, the equilibrium under consideration does not exist.

Suppose now  $\varphi \geq 1/3$ . As  $\alpha/(1+\alpha) < 1/3$  for any  $\alpha < 1/2$ , this automatically implies that the equilibrium of Lemma 7 exists. It is straightforward to derive that  $X_{TO} \in (X', X'')$ . Now we can use a geometrical argument similar to the one in Lemma 7 to show that the equilibrium under consideration does not meet the credible beliefs requirement. In Figure 5 point  $D'$  corresponds to  $X_{TO}$ , and the upward-sloping line going through  $D'$  is the acquirer's payoff in the equilibrium under consideration. The upward sloping line passing through  $A$  (point where  $X = X'$ ) is the acquirer's payoff from a block trade at the equilibrium price defined in Lemma 2. The upward-sloping line going through point  $D$  is the acquirer's payoff from a tender offer at the equilibrium bid from Lemma 7.

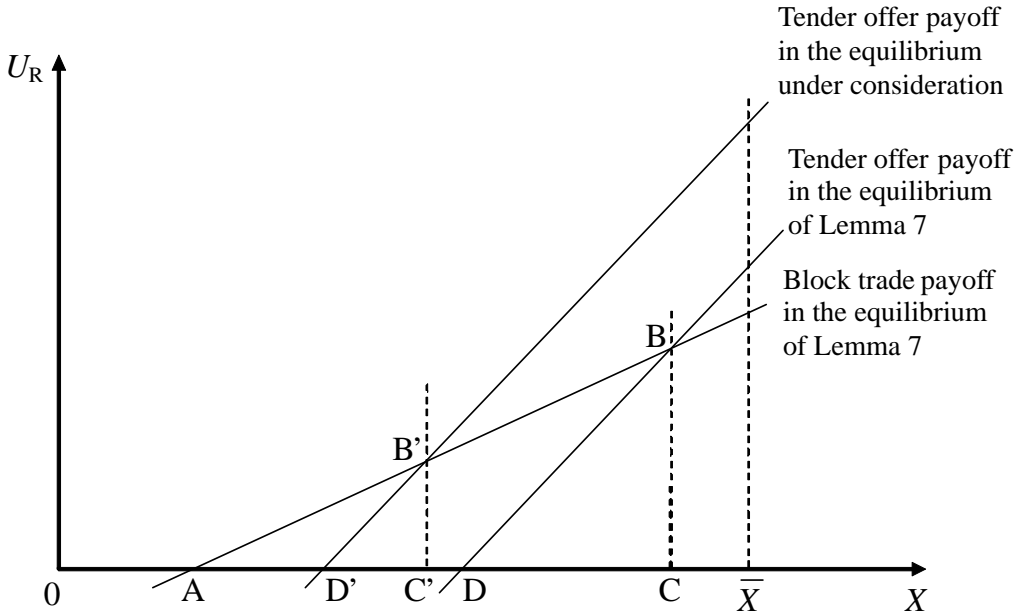


Figure 5. Application of the credible beliefs criterion for Lemma 8.

Consider the deviation of types from segment  $AC'$  to price  $p^*$  from Lemma 2. If  $p^*$  is accepted, they clearly want to deviate, while the rest of types will not. Will the incumbent

accept  $p^*$  if he believes that such an offer is from a type on  $AC'$ ? The answer is yes. Following the argument similar to the one used in Lemma 7,  $AD'/D'C' = AD/DC$ . That is, the proportion of types who would go for a tender offer following rejection of  $p^*$  is the same regardless of the bid price the acquirer would pay in a tender offer. According to formula (7) from the proof of Lemma 7, the incumbent is indifferent between accepting  $p^*$  and rejecting it, when the bid is the equilibrium bid of Lemma 7. However, in the equilibrium under consideration the bid is *lower* than the bid from Lemma 7: it is equal to  $(1 - \varphi)\frac{X_{TQ} + \bar{X}}{2} < (1 - \varphi)\frac{X'' + \bar{X}}{2}$ . Hence, the incumbent will strictly prefer to accept  $p^*$ , and the proposed equilibrium does not satisfy the criterion of Grossman and Perry (1986). ■

**Proof of Lemma 9.** First of all, let us show that in such type of equilibrium  $p^*$  must be equal to  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . Imagine  $p^* > (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2} \equiv \tilde{p}$ . Then the raider could deviate by offering a lower  $p$ , get rejected and acquire control in a tender offer by bidding  $b = \tilde{p}$ . Such a bid guarantees that at least the incumbent will tender his share. If  $E((1 - \varphi)X | b = \tilde{p}) > \tilde{p}$ , only the incumbent will tender. This implies that any raider who is supposed to acquire the block at price  $p^* > \tilde{p}$  would gain from the deviation. If  $E((1 - \varphi)X | b = \tilde{p}) < \tilde{p}$ , all shareholders tender. If  $(1 - \varphi)\bar{X} > \tilde{p}$ , this means that the raider with  $X = \bar{X}$  makes a profit on buying shares at  $\tilde{p}$ , and, since  $\tilde{p} < p^*$ , gains more from acquiring 100% of the company at  $\tilde{b}$  than from buying just the incumbent's block at  $p^*$  (formally,  $\bar{X} - \tilde{p} > \alpha((1 - \varphi)\bar{X} - p^*) + \varphi\bar{X}$ ). If  $(1 - \varphi)\bar{X} < \tilde{p}$ , the raider with  $X = \bar{X}$  prefers acquiring 100% at  $(1 - \varphi)\bar{X}$  (the shareholders will accept such a bid) to buying just the incumbent's block at  $p^*$ , because she makes zero profit on buying shares at  $(1 - \varphi)\bar{X}$  and negative profit on buying shares at  $p^*$  (formally,  $\varphi\bar{X} > \alpha((1 - \varphi)\bar{X} - p^*) + \varphi\bar{X}$ ). Thus, if  $p^* > (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ , there is always a profitable deviation at least for type  $\bar{X}$ .

Imagine now  $p^* < (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . If the negotiations fail, some types of raiders might go for a (successful) tender offer. Let us denote the out-of-equilibrium bid of such raiders by  $\tilde{b}$  (if there are indeed types who would do a tender offer). Obviously,  $\tilde{b} \leq (1 - \varphi)\bar{X}$ . Clearly, it must be that  $\tilde{b} < p^*$ , for if it was not, the incumbent would never agree to price  $p^*$ . Indeed, he would then get strictly more in expectation by rejecting, unless  $\tilde{b} = p$  and *all* types from  $(X_{BT}, \bar{X}]$  go for a tender offer after rejection. But if all types from  $(X_{BT}, \bar{X}]$  prefer acquiring 100% at  $\tilde{b}$  to abstention<sup>32</sup>, then all these types also prefer acquiring 100% at  $\tilde{b}$  to the block trade at  $p$ , since, as we know, the raider's payoff as a function of  $X$  is steeper in the case of a full acquisition. But if  $\tilde{b} < p^*$ , then the type  $\bar{X}$  would clearly gain by making a tender offer at  $\tilde{b}$ , because she makes a profit from buying shares at  $\tilde{b}$  (formally,  $\bar{X} - \tilde{b} > \alpha((1 - \varphi)\bar{X} - p^*) + \varphi\bar{X}$ ).

Thus, we have proved that  $p^* = (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ . The type with  $X = X_{BT}$  must be indifferent between acquiring the block and abstaining:

$$\alpha[(1 - \varphi)X_{BT} - p^*] + \varphi X_{BT} = 0,$$

from which we obtain  $X_{BT} = \bar{X}/2$ .

Now, we need two conditions to be satisfied: the raider must be unable to gain from a tender offer, and the incumbent must find it rational to accept  $p^*$ .

Denote by  $b_{\min}$  the minimum bid at which the raider can acquire 100% of the company via a tender offer out of equilibrium. (In the equilibrium under consideration, if the dispersed

<sup>32</sup>Since  $\tilde{b} < (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ , a successful tender offer implies that all shareholders tender.

shareholders observe a bid, they will form some out-of-equilibrium beliefs about  $X$ . For any given mapping from  $b$  into the distribution of beliefs, one can find the minimum  $b$  at which the dispersed shareholders will tender their shares.) In order to make the deviation as unattractive as possible, let us set  $b_{\min}$  is  $(1 - \varphi)\bar{X}$ . Any shareholder would agree to sell at this price regardless of his beliefs, and we assume that for all  $b < (1 - \varphi)\bar{X}$  the shareholders believe that  $E((1 - \varphi)X | b) > b$ . We will later show that the credible beliefs criterion is satisfied.

For the raider not to deviate, it must be that, for any  $X \in (\bar{X}/2, \bar{X}]$

$$\alpha[(1 - \varphi)X - p^*] + \varphi X \geq X - (1 - \varphi)\bar{X}$$

For the inequality to hold for any  $X \in (\bar{X}/2, \bar{X}]$ , it is necessary and sufficient that it holds for  $\bar{X}$ . Given the expression for  $p^*$ , it can then be rewritten as

$$p^* \equiv (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2} \leq (1 - \varphi)\bar{X} \quad (8)$$

This condition means that in the case the game goes to the tender offer stage, the raider will always offer bid  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$ , for if  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2} < (1 - \varphi)\bar{X}$  she gains more from buying just the incumbent's stake at  $p^*$  relative to taking over the whole company at  $(1 - \varphi)\bar{X}$  (formally,  $\alpha[(1 - \varphi)X - p^*] + \varphi X > X - (1 - \varphi)\bar{X}$ ).

Then, the acceptance condition for the incumbent is satisfied: he will agree to sell at  $p^*$ , because he would get the same  $p^*$  if he refuses, regardless of whether the raider would abstain or launch a tender offer.

Condition (8) boils down to

$$\varphi \leq \frac{\alpha}{1 + \alpha}$$

Thus, we have proved all statements of the lemma except the satisfaction of the credible beliefs criterion. Let us show that the out-of-equilibrium beliefs we assumed do satisfy the criterion. Imagine there is some  $b < (1 - \varphi)\bar{X}$  such that the shareholders accept this  $b$ . Then, the set of raiders who would deviate from the equilibrium and bid  $b$  is  $(\tilde{X}, \bar{X}]$ , where  $\tilde{X}$  is determined either by  $\alpha[(1 - \varphi)\tilde{X} - p^*] + \varphi\tilde{X} = \tilde{X} - b$  when  $\tilde{X} \geq \bar{X}/2$ , or by  $\tilde{X} - b = 0$  when  $\tilde{X} < \bar{X}/2$ . But then it can be easily shown that, in both cases,  $b < (1 - \varphi)\frac{\tilde{X} + \bar{X}}{2}$ , which implies that the shareholders would actually *not* accept  $b$ . ■

**Proof of Lemma 10.** First, it must be that

$$b^* \leq (1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2} \quad (9)$$

Imagine this is not the case. Then the raider could acquire control by offering  $(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}$  to the incumbent. The incumbent would agree to sell at this price. Regardless of whether the dispersed shareholders would tender or not, at least types with  $\alpha[(1 - \varphi)\frac{\bar{X}}{2} + \frac{\varphi}{\alpha}\frac{\bar{X}}{2}] / [\alpha(1 - \varphi) + \varphi] < X < b^*/(1 - \varphi)$  would gain from such a deviation.

Second, the lemma is silent about how exactly the acquisition occurs: the raider can either first buy the block at  $b^*$  and then make a mandatory tender offer, or offer a very low price to the incumbent, get rejected and make a tender offer at  $b^*$ . In either case, the outcome is the same and requires that  $b^* \geq (1 - \varphi)\frac{X_{TQ} + \bar{X}}{2}$ . Similarly to Lemma 7, for an equilibrium to satisfy

the credible beliefs criterion, it must be that

$$b^* = (1 - \varphi) \frac{X_{TO} + \bar{X}}{2} \quad (10)$$

Finally,  $X_{TO}$  must satisfy

$$X_{TO} = b^* \quad (11)$$

Conditions (10) and (11) yield

$$b^* = \frac{1 - \varphi}{1 + \varphi} \bar{X}$$

Note that  $b^* \in (0, \bar{X})$ , so the equilibrium under consideration will exist if and only if the obtained  $b^*$  satisfies (9):

$$\frac{1 - \varphi}{1 + \varphi} \bar{X} \leq (1 - \varphi) \frac{\bar{X}}{2} + \frac{\varphi}{\alpha} \frac{\bar{X}}{2}, \quad (12)$$

which amounts to

$$\varphi \geq \frac{\sqrt{8\alpha + 1} - 2\alpha - 1}{2 - 2\alpha} \equiv \varphi_{TO}$$

It can be easily derived that  $\varphi_{TO} < \alpha/1 + \alpha$ . ■

**Proof of Lemma 11.** First of all, notice that, for the same reasons as in the same type of equilibrium in Section 4, in such an equilibrium it must be that  $p^* = (1 - \varphi) \frac{\bar{X}}{2} + \frac{\varphi}{\alpha} \frac{\bar{X}}{2}$  and  $X_{BT} = \bar{X}/2$ .

It must also be that the dispersed shareholders do not tender their shares at  $p^*$ , which implies that they must believe that  $p^*$  is below the expected security benefits of the raider with  $X \geq X_{BT}$

$$(1 - \varphi) \frac{\bar{X}}{2} + \frac{\varphi}{\alpha} \frac{\bar{X}}{2} \leq (1 - \varphi) \frac{X_{BT} + \bar{X}}{2}$$

Given that  $X_{BT} = \bar{X}/2$ , we obtain

$$\varphi \leq \frac{\alpha}{2 + \alpha} < \frac{\alpha}{1 + \alpha}$$

■

**Proof of Lemma 12.** In such an equilibrium, a raider with  $X = \tilde{X}$  must be indifferent between acquiring share  $\beta$  and abstaining:

$$\beta \left[ (1 - \varphi) \tilde{X} - (1 - \varphi) \frac{\bar{X}}{2} - \frac{\varphi}{\alpha} \frac{\bar{X}}{2} \right] + \varphi \tilde{X} = 0,$$

which yields

$$\tilde{X}(\beta) = \frac{\beta \left[ (1 - \varphi) \frac{\bar{X}}{2} + \frac{\varphi}{\alpha} \frac{\bar{X}}{2} \right]}{\beta(1 - \varphi) + \varphi} > \bar{X}/2 \text{ for any } \beta \in (\alpha, 1) \quad (13)$$

The dispersed shareholders must be indifferent between tendering and not tendering, which implies

$$(1 - \varphi) \frac{\bar{X}}{2} + \frac{\varphi}{\alpha} \frac{\bar{X}}{2} = E((1 - \varphi)X \mid X \geq \tilde{X}(\beta)) = (1 - \varphi) \frac{\tilde{X}(\beta) + \bar{X}}{2} \quad (14)$$

From (13) and (14) we obtain

$$\varphi = \frac{\sqrt{\beta^2 + 8\alpha\beta} - \beta - 2\alpha\beta}{4 - 2\beta - 2\alpha\beta} \equiv \tilde{\varphi}(\beta),$$

which can be shown to be increasing in  $\beta$ . Moreover, one can easily derive that  $\tilde{\varphi}(\alpha) = X_{BT}$ , and  $\tilde{\varphi}(1) = X_{TO}$ . ■

## References

- [1] Albuquerque, Rui A., and Enrique J. Schroth, 2008, The determinants of the block premium and of private benefits of control, ECGI Finance Working Paper No.202/2008.
- [2] Allen, Jeffrey W., and Gordon M. Phillips, 2000, Corporate equity ownership, strategic alliances, and product market relationships, *Journal of Finance* 55, 2791–2815.
- [3] At, Christian, Mike Burkart, and Samuel Lee, 2011, Security-voting structure and bidder screening, *Journal of Financial Intermediation* 20, 458–476.
- [4] Banerjee, Saugata, Benoit Leleux, and Theo Vermaelen, 1997, Large shareholdings and corporate control: An analysis of stake purchases by French holding companies, *European Financial Management* 3, 22–43.
- [5] Barclay, Michael J., and Clifford G. Holderness, 1991, Negotiated block trades and corporate control, *Journal of Finance* 46, 861–878.
- [6] Bebchuk, Lucian A., 1994, Efficient and inefficient sales of corporate control, *Quarterly Journal of Economics* 109, 957–993.
- [7] Bebchuk, Lucian A., 1999, A rent-protection theory of corporate ownership and control, NBER Working Paper 7203.
- [8] Bris, Arturo, and Christos Cabolis, 2008, The value of investor protection: Firm evidence from cross-border mergers, *Review of Financial Studies* 21, 605–648.
- [9] Berglöf, Erik, and Mike Burkart, 2003, European takeover regulation, *Economic Policy* 18, 171–213.
- [10] Burkart, Mike, and Samuel Lee, 2010, Signaling in tender offer games, CEPR Discussion Paper No. DP7938.
- [11] Burkart, Mike, Denis Gromb, and Fausto Panunzi, 2000, Agency conflicts in public and negotiated transfers of corporate control, *Journal of Finance* 55, 647–677.
- [12] Burkart, Mike, Fausto Panunzi, and Andrei Shleifer, 2003, Family firms, *Journal of Finance* 58, 2173–2207.
- [13] Burkart, Mike, Denis Gromb, Holger M. Mueller, and Fausto Panunzi, 2012, Legal investor protection and takeovers, working paper.

- [14] Chowdhry, Bhagwan, and Narasimhan Jegadeesh, 1994, Pre-tender offer share acquisition strategy in takeovers, *Journal of Financial and Quantitative Analysis* 29, 117–129.
- [15] Claessens, Stijn, Simeon Djankov, and Larry H.P. Lang, 2000, The separation of ownership and control in East Asian corporations, *Journal of Financial Economics* 58, 81–112.
- [16] Dyck, Alexander, and Luigi Zingales, 2004, Private benefits of control: An international comparison, *Journal of Finance* 59, 537–600.
- [17] Faccio Mara, and Larry H.P. Lang, 2002, The ultimate ownership of Western European corporations, *Journal of Financial Economics* 65, 365–395.
- [18] Goergen, Marc, and Luc Renneboog, 2004, Shareholder wealth effects of European domestic and cross-border takeover bids, *European Financial Management*, 10, 9–45.
- [19] Grossman, Sanford J., and Oliver D. Hart, 1980, Takeover bids, the free-rider problem and the theory of the corporation, *Bell Journal of Economics* 11, 42–64.
- [20] Grossman, Sanford J., and Motty Perry, 1986, Perfect sequential equilibria, *Journal of Economic Theory* 39, 97–119.
- [21] Hirshleifer, David, and Sheridan Titman, 1990, Share tendering strategies and the success of hostile takeover bids, *Journal of Political Economy* 98, 295–324.
- [22] Holderness, Clifford, 2009, The myth of diffuse ownership in the United States, *Review of Financial Studies* 22, 1377–1408.
- [23] Holmén, Martin, and Eugene Nivorozhkin, 2012, Tender offers versus block trades: Empirical Evidence, *Managerial and Decision Economics* 33, 511–529.
- [24] Kang, Jun-Koo, and Jin-Mo Kim, 2008, The geography of block acquisitions, *Journal of Finance* 63, 2817–2858.
- [25] Liao, Rose, 2011, What drives corporate block acquisitions? The case for financial constraints, Working Paper, Rutgers University.
- [26] Martynova, Marina., and Luc Renneboog, 2008, A century of corporate takeovers: What have we learned and where do we stand? *Journal of Banking and Finance* 32, 2148–77.
- [27] Rossi, Stefano, and Paolo F. Volpin, 2004, Cross-country determinants of mergers and acquisitions, *Journal of Financial Economics* 74, 277–304.
- [28] Trojanowski, Grzegorz, 2008, Equity block transfers in transition economies: Evidence from Poland, *Economic Systems* 32, 217–238.
- [29] Shleifer, Andrei, and Robert W. Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94, 461–488.
- [30] Zingales, Luigi, 1995, Insider ownership and the decision to go public, *Review of Economic Studies* 62, 425–448.